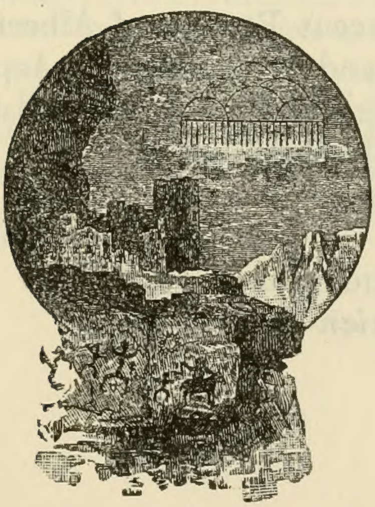
SHOUT
SHARE
IT

U6X
no. 173
SOA

SMITHSONIAN INSTITUTION
BUREAU OF AMERICAN ETHNOLOGY
BULLETIN 173

ANTHROPOLOGICAL PAPERS

Numbers 57–62



UNITED STATES
GOVERNMENT PRINTING OFFICE
WASHINGTON : 1960

LETTER OF TRANSMITTAL

Smithsonian Institution,
Bureau of American Ethnology,
Washington, D. C., June 25, 1958.

Sir: I have the honor to submit the accompanying manuscripts, entitled "Preceramic and Ceramic Cultural Patterns in Northwest Virginia," by C. G. Holland; "An Introduction to Plains Apache Archeology—the Dismal River Aspect," by James H. Gunnerson; "The Use of the Atlatl on Lake Patzcuaro, Michoacan," by M. W. Stirling; "A Caroline Islands Script," by Saul H. Riesenberg and Shigeru Kaneshiro; "Dakota Winter Counts as a Source of Plains History," by James H. Howard; "Stone Tipi Rings in North-Central Montana and the Adjacent Portion of Alberta, Canada: Their Historical, Ethnological, and Archeological Aspects," by Thomas F. Kehoe, and to recommend that they be published as a bulletin of the Bureau of American Ethnology.

Very respectfully yours,

Frank H. H. Roberts, Jr., *Director.*

Dr. Leonard Carmichael,
Secretary, Smithsonian Institution.

SMITHSONIAN
JUN 8 1960
LIBRARY

CONTENTS

PAGE

No. 57. Preceramic and Ceramic Cultural Patterns in Northwest Virginia, by C. G. Holland ---- 1

No. 58. An Introduction to Plains Apache Archeology—the Dismal River Aspect, by James H. Gunnerson ---- 131

No. 59. The Use of the Atlatl on Lake Patzcuaro, Michoacan, by M. W. Stirling ---- 261

No. 60. A Caroline Islands Script, by Saul H. Riesenberg and Shigeru Kaneshiro ---- 269

No. 61. Dakota Winter Counts as a Source of Plains History, by James H. Howard ---- 335

No. 62. Stone Tipi Rings in North-Central Montana and the Adjacent Portion of Alberta, Canada: Their Historical, Ethnological, and Archeological Aspects, by Thomas F. Kehoe ---- 417

Index ---- 475

SMITHSONIAN INSTITUTION JUN 3 1960

SMITHSONIAN INSTITUTION
Bureau of American Ethnology
Bulletin 173

Anthropological Papers, No. 57

PRECERAMIC AND CERAMIC CULTURAL PATTERNS IN NORTHWEST VIRGINIA

By C. G. HOLLAND

CONTENTS

PAGE

Preface 5
Introduction 7
Geographical description of northwest Virginia 9
Site descriptions 12
  Introduction 12
  Augusta County 15
  Bath County 31
  Highland County 33
  Rockingham County 36
  Rockbridge County 40
Projectile points and large blades 43
Miscellaneous artifacts 53
Analysis and interpretation of the pottery 58
Rock material 65
Habitation patterns 74
Relationship of the sequences of northwest Virginia to archeology of Eastern United States 80
Appendix. Tables of projectile-point and blade types, rock material, chips, and other artifacts, and pottery classifications 90
Literature cited 128

ILLUSTRATIONS

TEXT FIGURES

PAGE

1. Geographical location of all the sites in the survey 13
2. Projectile-point types 44
3. Large blade types 45
4. Primary seriation of projectile points and large blades from sites with 50 or more artifacts (facing) 48
5. Secondary seriation of projectile points and large blades from sites with 20 to 48 artifacts interdigitated into the primary sequence of figure 4 (facing) 52
6. Artifact types: *a*, Crude ax; *b*, crude celt; *c*, polished celt 54
7. Artifact types: *a*, Hafted scraper; *b*, end scraper; *c*, side scraper; *d*, graver; *e*, drill; *f*, hammer-anvil stone; *g*, chlorite pipe; *h*, clay pipe 55
8. Seriated sequence of sites based on pottery 62
9. A temporal sequence based on rock types (facing) 69
10. Distribution of "quartzite-using" and "chert-using" sites of the preceramic and ceramic horizon 70
11. Direction of movement of the Stony Creek Pottery Series from the Central and North Central Ceramic Area into northwest Virginia 72
12. Direction of movement of the Radford Pottery Series into northwest Virginia 73

PREFACE

This report is dedicated to Clifford Evans, associate curator, division of archeology, United States National Museum, and to his wife, Betty J. Meggers, research associate, Smithsonian Institution. Not only did they teach me the essentials of archeological methodology and theory, but they also had a hand in the mundane task of digging some of the sites in the study. Further, they read several versions of the manuscript and advised numerous alterations and suggestions which have been incorporated. Dr. Evans classified all the pottery; Dr. Meggers prepared the drawings of the maps and seriation charts.

Thanks are also due Henry W. Setzer, Joseph P. E. Morrison, and Herbert W. Friedmann, of the divisions of mammals, mollusks, and birds, respectively, of the United States National Museum, for their identifications of shells and bones.

For companionship and aid in the field, appreciation is expressed to Roy Roby of Staunton, Va., and to my family—my wife Louise, and my children, Peter and Cary.

I am indebted to Mrs. Carol Colby for typing two versions of the manuscript.

C. G. Holland,
5492 East Belmont Avenue,
Fresno, Calif.

July 1, 1955.

PRECERAMIC AND CERAMIC CULTURAL PATTERNS IN NORTHWEST VIRGINIA

By C. G. Holland

INTRODUCTION

The survey of Augusta, Bath, Highland, Rockingham, and Rockbridge Counties, Va., began in November 1950 and continued through August 1952, although some sites had been visited in previous years. Staunton, centrally placed in Augusta County, was the base for fieldwork throughout the entire survey, which undoubtedly accounts for the disproportionately large number of sites reported from this county. Fifty-one sites were identified in Augusta, 14 in Rockingham, 9 in Highland, 7 in Rockbridge, and 1 in Bath, a total of 82. The accumulated material from all sites amounted to 2,425 potsherds, 3,325 projectile points and large blades, 257 other artifacts, and 8,715 chips. Perishable items, such as bone and shell, were encountered at only six sites.

All the collections represent surface materials, although excavations were attempted. Four rock shelters were excavated, but at none was the cultural debris found in sufficient depth to be usable in stratigraphic analysis. Two middens were test pitted, but the material was found to be homogeneous from top to bottom. Two sites on open fields were tested for depth, and at neither was the evidence of occupation greater than 8 inches, or about the depth of the plow zone. Four mounds were tested with incomplete results. At two, East Mound (AU-35-M) and Lewis Creek Mound (AU-20), burials were encountered, but an insufficient number of artifacts were recovered to be statistically usable in this study. The Clover Creek Mound (HD-9) was tested with two small pits without productive results. Since Fowke (1894, pp. 31-32) had dug this mound, an appeal to the United States National Museum was made for analysis of the pottery, and this was supplied. As Fowke's excavation leaves the data on provenience of the potsherds a matter of conjecture, they had to be treated as a unit as if they had come from the surface. Limited testing in the Hayes Creek Mound produced only fragments of human bones.

Interested individuals were most helpful throughout the study. Virginia farmers willingly offered permission to trespass and often helped to collect material. Howard MacCord, who had lived near Greenville in Augusta County for several years, offered his data freely. A considerable number of the sites discussed in the section "Site Descriptions" (pp. 12–43) had been originally located by MacCord. Some of these are published for the first time, and in several instances the data and material he collected comprise the only information about the site. Roy Roby located and collected much of the material from AU–45. He is also responsible for bringing to my attention two rock shelters, AU–27 and AU–28, and the artifacts on display at Natural Chimneys, a widely known tourist attraction. W. H. Plumb of Waynesboro had collected from AU–9 for many years but, regrettably, could positively identify only two objects from the site in his extensive collection.

The early archeological literature of northwestern Virginia, provided largely by Fowke and Valentine, might have been more helpful if the survey had continued over a longer period of time, i. e., 5 to 10 years. The Gala site (Fowke, 1894, pp. 17–23) is now under sod as the lawn of a power station. I was not able to relocate the Wallace Mounds in Highland County and did not visit the very productive Linville site in Rockingham County (ibid., pp. 37–44). The Keyser Farm site (Manson, MacCord, and Griffin, 1944) has already been the subject of an excellent report, but MacCord states that a fair portion of the total site remains to be dug. The Koiner Mound in Augusta County (Valentine Museum, 1898, p. 58), represented by fragments of bone and a right-angle chlorite pipe at the Valentine Museum, Richmond, Va., appears to be lost forever for lack of data. Material from the Hayes Creek Mound in Rockbridge County (RB–2) is represented mainly by skeletal material, an obtuse-angle chlorite pipe, a similar one of clay, shell beads, and a few quartzite specimens. Sherds from this mound, reported by Valentine (Valentine Museum, 1903), could not be located at the Museum. The pottery at the Valentine Museum from the Battle or Bell Mound No. 1 (RB–7) in Rockbridge County was sufficiently documented to study and has been incorporated in this report.

As potsherds, projectile points, and miscellaneous artifacts were brought from the field they were washed, numbered with India ink, and then analyzed. The analysis was recorded on data sheets and the material stored by site in separate containers. The chips were sorted into rock types, recorded by type and site, and then discarded. At first, outline drawings of stone artifacts were made to accompany each site description; however, as soon as types were established, the drawing of each of these objects was discontinued. All sites were plotted on United States Geological and Geodetic survey quadrangle maps, described in detail in a field notebook and mapped by sketching.

For final analysis most of the data were collected in the statistical tables (see Appendix, p. 90). Some sites were unproductive and the few data they provided, while enlarging the scope of the survey, are not usable in the quantitative comparisons but are recorded for future comparative use. The major portion of the materials of this study was presented to the division of archeology of the United States National Museum, Washington, D. C.

The report is divided into several distinct sections: Introduction, geographical description of northwest Virginia, site descriptions with an explanation of the grouping of the sites with related features and artifacts into distinct categories, the analysis of the projectile points and blades, a study of miscellaneous artifacts, the classification and analysis of the sherds, an analysis of the rock material, the habitation patterns with reference to the geographical situation and possible changes through time, and the relationship of the sequences of northwest Virginia to the surrounding area. All the supporting data for the classifications and seriational studies are in the Appendix arranged by site for easy reference in tables 6 and 7. Although all the stone artifacts were classified by the author, the sherds were classified by Clifford Evans following the types established in his ceramic study of the archeology of Virginia (1955).

Since the theory behind cultural change has been handled many times and the methods by which the archeologist can demonstrate this depend on the nature of the sites, the artifacts available, etc., and as the nature of this paper in not a theoretical one but rather an effort to add more archeological information to a portion of the East which to date has been sadly neglected by professional archeologists, these points of methodology and theory will not be explained here, except where it is essential to the understanding of a particular situation. For those students interested in these factors, reference is made to the recent study of Clifford Evans, "A Ceramic Study of Virginia Archeology," with an Appendix, "An Analysis of Projectile Points and Blades," by C. G. Holland (1955). Here a full explanation of classification and seriation is given, with bibliographic references.

GEOGRAPHICAL DESCRIPTION OF NORTHWEST VIRGINIA

Virginia, geographically a member of the Middle Atlantic States, is usually considered archeologically as the "Southeast," or that region roughly outlined by the Ohio River to the north and the

Mississippi River to the west. In common with the geography of States from Maryland through Georgia, there are three physiographic zones, which, from east to west, are the tidewater plain, the rolling Piedmont section, and the mountains. The tidewater section extends from the Atlantic coast to the fall lines of principal rivers, roughly defined by the northeast-southwest position of Washington on the Potomac, Fredericksburg on the Rappahannock, Richmond on the James, and Weldon, N. C., on the Roanoke River. The Piedmont, composed of low rounded hills, extends from this line to the mountains. In Virginia the eastern mountain range, the Blue Ridge Mountains, extends the entire length of the State in a northeast-southwest direction. West of this range are numerous ranges, peaks, and valleys of the Alleghenys which extend over West Virginia, Tennessee, and Kentucky.

The area of study is west of the Blue Ridge Mountains in the northwest portion of the State, and covers an area roughly 50 miles north and south and an equal distance east and west. In the northern part of the survey area, three rivers, the South, Middle, and North, unite at Port Republic in Rockingham County to form the South Fork of the Shenandoah River. This river joins the North Fork 50 miles to the northeast, whence the main stream continues northeastward to Harper's Ferry where it unites with the Potomac River. The South, Middle, and North Rivers drain the eastern and northern part of Augusta County. The southern and western part of Augusta County is drained southward by another South River and the Calfpasture River. These rivers flow through Rockbridge County into the James River.

It should be made clear that there are two South Rivers. They will be identified by placing after each, in parenthesis, whether they flow into the James River or into the South Fork of the Shenandoah River. However, a study of the occupational complexes on these two South Rivers, arising a few miles apart and flowing in opposite directions along the western foot of the Blue Ridge Mountains, has shown a well-defined homogeneous preceramic horizon related to both of them. For this reason the area through which these rivers flow is called the "South Rivers District."

West of Augusta County, between it and West Virginia, is Highland County, so called because it is completely permeated by the Allegheny Mountains. In the northern tip of this county are some sources of the Potomac River, but the major portion is drained into the James River by the Cowpasture, Bullpasture, and Jackson Rivers. South of Highland County on the West Virginia line is Bath County. East of Bath and south of Augusta County is Rockbridge County. The major streams cross this county flowing generally southeastward to unite with the James River.

There are two general types of terrain encountered in the survey area. The central and northern portions are composed of broad valleys and rolling land at about 1,000 feet above sea level. The western and southern portions have narrow valleys and are considered mountainous, with peaks reaching 2,000 and 3,000 feet above sea level. Local traditions and historic events, such as massacres, indicate that no physical feature acted as a barrier to Indian parties traveling north and south and coming from the west. There are no records of migrations from east to west of the Blue Ridge Mountains, but there is some indication that in the early 1700's Indians crossed the Blue Ridge Mountains from the west.

The entire section west of the South Rivers district is underlain with limestone and shale which belong to various geologic ages. In this region, which begins abruptly west of the South Rivers district, are numerous caves, some of them as large as Grand Caverns at Grottoes in Rockingham County. Although several caves outside the survey area contained burials, there appears to have been very little use made of them in aboriginal times in the five counties under study.

A knowledge of the rock types available in northwest Virginia is of significance, for it has considerable bearing on the study of the chips from the various sites. In this area the rocks of main archeological importance are chert and quartzite. The former exists either as blue, blue-gray, or gray inclusions or as strata in the limestone. Along the eastern slope of Mill Mountain west of the Calfpasture, natural spallings of chert are profuse. Strata of purple Erwin quartzite were not seen, but numerous boulders were observed in the vicinity of Rockbridge Baths and Goshen in Rockbridge County. White quartz was observed infrequently in strata throughout the entire survey area. In the South Rivers district on the northwestern slope of the Blue Ridge Mountains there are tall cliffs of gray to yellow-gray Erwin-Antietam quartzite. Butts (1940, p. 39) states that this type occurs only along the northwestern flanks of the Blue Ridge. In the area under study the main mass appears to have been a thoroughly sorted, clean white beach sand. The grains are completely cemented with silica to form a compact quartzite. Higher on the slope of the Blue Ridge Mountains are strata of greenstone, the color ranging from bluish, through gray-green to a relatively bright green.

In summary, the most unobstructed avenues of travel geographically have a northeast-southwest course. This is generally the present-day axis of western North Carolina and eastern Tennessee and Kentucky on the southwest and western Maryland and Pennsylvania on the northeast. Traditionally, the historic Indians frequently utilized paths in this direction as opposed to the much more rugged treks east and west over the mountains. Bottomlands, enclosed by the mountains, are fertile; water is plentiful and many streams are large enough to float canoes or dugouts satisfactorily. Certainly, the raw materials for the aboriginal manufactures are near at hand: clays for pottery; sand, limestone and other rocks for tempering materials; quartzite, chert, and quartz for blades and points; greenstone for axes and celts; and steatite is available immediately east of the Blue Ridge Mountains. One may expect from the geography of the region that the local settlements and their preference for certain local materials for artifacts were more easily influenced, either by migration or diffusion, from the northeast or southwest. However, this does not mean, as will be shown, that geography alone determined the spread of cultural influences within the area under study, although it is a factor which must be kept in mind throughout the entire report.

SITE DESCRIPTIONS

(Fig. 1)

INTRODUCTION

Sites were lettered and numbered serially after the custom of the River Basin Surveys. A list of Virginia county abbreviations had been prepared by Howard MacCord in conjunction with Carl Miller when the latter began his survey in the Buggs Island Reservoir. This system was published (MacCord, 1947) and is followed here: Augusta County is AU; Bath County, BA; Highland County, HD; Rockingham County, RM; and Rockbridge County, RB. As each site came under observation it was numbered sequentially, i. e., AU–1, AU–2, etc. Four exceptions were made to this standard procedure where it was necessary to separate cultural complexes through study of several adjacent areas. On the East farm, near Churchville, a mound, AU–35–M, and two village sites, AU–35–V–1 and AU–35–V–2, were finally identified as separate entities. At RM–4 a ceramic complex was initially observed. Later it was determined that a peripheral portion of the ceramic complex extended through an unplowed zone and intermingled with a preceramic horizon. The area having a mixture of cultures was designated RM–4A. Still later a circumscribed, isolated preceramic complex was located at a distance west of RM–4A and this was designated RM–4B. A circumscribed ceramic complex was isolated in a large preceramic site RM–1

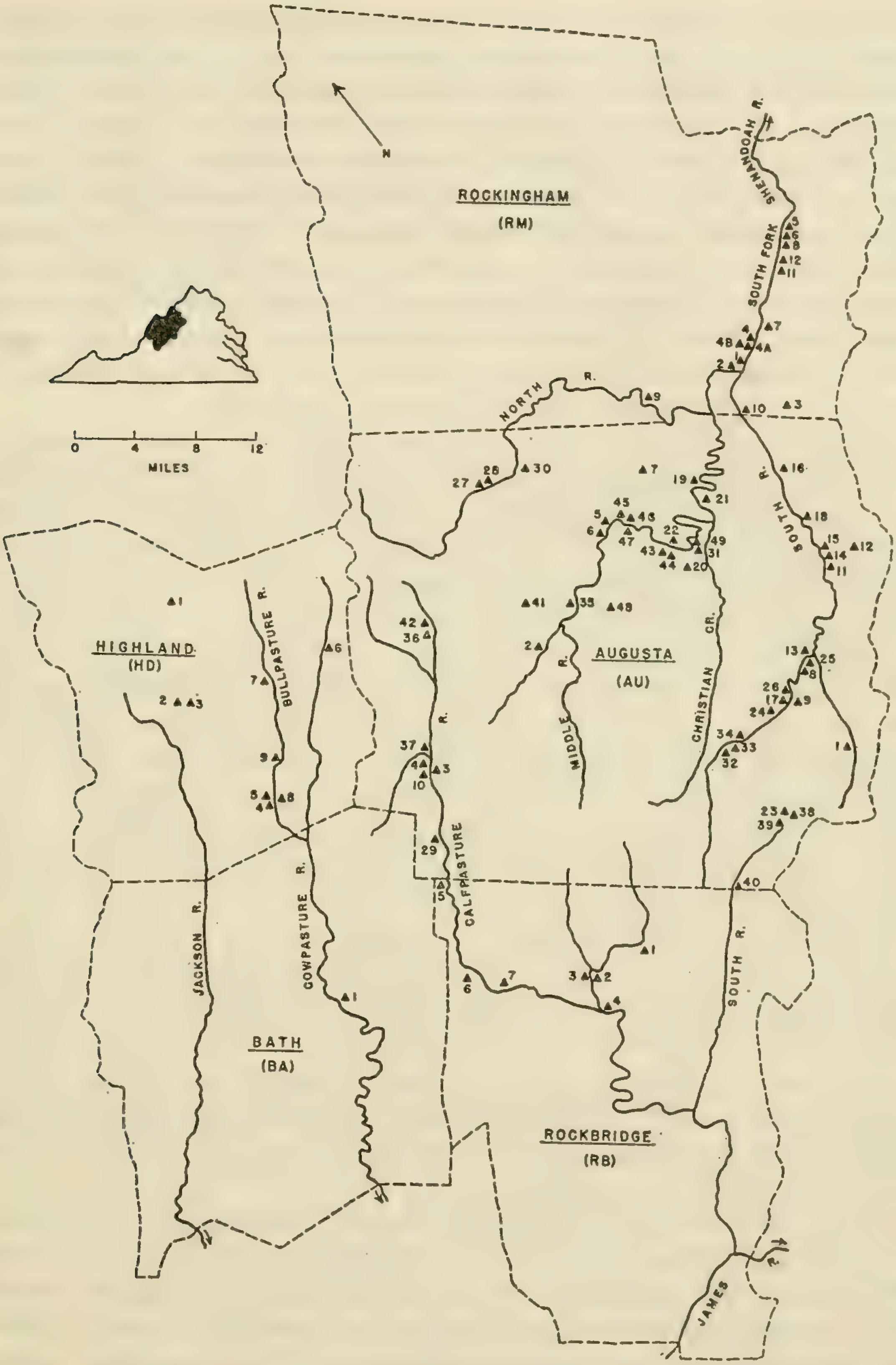

N
ROCKINGHAM
(RM)
SHENANDOAH R.
SOUTH FORK
NORTH R.
0
4
8
12
MILES
HIGHLAND
(HD)
BULLPASTURE R.
AUGUSTA
(AU)
MIDDLE R.
CHRISTIAN CR.
SOUTH R.
CALFPASTURE R.
COWPASTURE R.
JACKSON R.
BATH
(BA)
ROCKBRIDGE
(RB)
SOUTH R.
JAMES R.
5
6
8
12
11
7
4
48
4A
2
1
9
10
3
27
28
30
7
19
21
16
45
5
46
6
47
22
49
43
31
44
20
18
15
12
14
11
41
35
48
42
36
2
13
25
8
26
17
9
24
34
33
32
1
23
38
39
37
4
3
10
29
15
40
1
3
2
4
6
7
1
2
3
7
9
5
8
4
6
1

Figure 1.—Geographical location of all the sites in the survey.

and was designated RM–1A. Finally a rock mound and a preceramic site, AU–3, were found in close apposition; the mound was designated AU–3A.

It was impossible to give longitude and latitude with sufficient accuracy to be of use in relocating sites; therefore it was necessary to find suitable landmarks from which to measure distances and give directions. The nearest distances were measured on United States Geologic and Geodetic Survey Quadrangle maps from relatively permanent landmarks. Wherever distances were measured from towns the present-day nearest boundary line was the point of reference. Directions have been given according to points of the compass, not mere estimates of general direction. Wherever possible, local landmarks and State highways were used to fix the position of a site. The highway numbers have been taken from county maps prepared by the Virginia Department of Highways, Richmond.

Owing to the limitations placed upon archeological work in heavily cultivated areas, it is not possible to reconstruct exactly the original extent of any occupational area, and the dimensions given here are the best obtainable under such conditions. Local features such as roads, grasslands, forest, and underbrush often have obscured and foreshortened the limits of many sites.

The oldest preceramic sites are readily identified by the popularity of quartzite, and for this reason preceramic "quartzite-using" station has been used to designate sites in this cultural horizon. Sites of a second, but more recent preceramic horizon, associated with high percentages of chert, have been called preceramic "chert-using" stations. These should be interpreted as devices appropriate to this report only; they may or may not have meaning outside the northwestern section of Virginia.

From time to time in the site descriptions the terms "terrace" or "river terrace" will be used. This does not necessarily have the same meaning a geologist would give these terms. They are used to denote a level, elevated belt, or narrow plain, higher than the riverbank and removed from it. A sloping bank elevates the "terrace" from the lower land and usually parallels the present-day course of the river. In many instances the banks of these terraces may have been the banks of old stream beds.

A few sites have exceptionally small assemblages of artifacts. There are two reasons for this: (1) Failure to visit a site many times over a longer period than the 2 years of the study; and (2) the ground being unsuitable for surface collecting owing to heavy pasture, lack of cultivation, and similar circumstances. The same sites, under more agreeable conditions or seen over a longer period, may well provide adequate material. Other small sites may not have been occupied long enough for a greater amount of refuse to accumulate. These sites may take on importance in future studies, but even in this survey they lend scope to patterns set by more productive sites.

All sites in this research project, regardless of the size of the collection, are plotted on figure 1.

The artifacts from each site, classified into their various types and rock material, as well as the sherds classified into the pottery types for Virginia as established by Evans (1955), are listed in tabular form in the Appendix, tables 6 and 7. It was felt that such a method of tabulating the classified material in one section was more useful to the interested student than scattering such information throughout the report. Only those sites with *exceedingly* small collections are eliminated from the tables and are mentioned under the site descriptions only.

AUGUSTA COUNTY

AU–1 is located 8 miles south of Waynesboro on the left (west) bank of Back Creek, between the creek and State Highway 664. It is 200 yards north of a wrought-iron furnace of Civil War vintage. As a result some fragments of furnace slag resembling obsidian are intermingled accidentally with the aboriginal cultural debris. The site is situated on a 15-foot terrace midway between the road and Back Creek, which are 100 yards apart. The area over which the artifacts were found is 25 to 30 yards in diameter.

This site was discovered by Howard MacCord, and with him the author visited it in 1947. The land had been plowed at that time, and we were able to determine the nature of the occupation. Cores and large percussion-made chips of quartzite were much more abundant than smaller pressure-flaked chips. There was a minor quantity of quartz and chert chips. This study was not in progress at that time so no chip count was made. Since then the ground has been so overgrown with grass that it has been impossible to form a new collection, thus only 31 points and blades were available for study.

AU–1 is typical of the preceramic "quartzite-using" stations of the South Rivers district in which it is located.

AU–2, Buffalo Gap (see also Evans, 1955, p. 10), is a rock shelter, 200 yards inside the George Washington National Forest. It is located 8.5 miles west of Staunton, in Buffalo Gap, and 15 yards from the left (north) bank of Buffalo Branch, a tributary of Middle River. United States Highway 42 is between the stream and shelter. The shelter has been formed in a north-south quartzite stratum which protrudes from the side of Little North Mountain at an angle of 45 degrees. It is approximately 30 feet long, 8 feet deep, and 6 to 10 feet high along the entrance. The floor rises at a 15-degree angle from the road, is strewn with boulders and has a series of small, level, rain-washed, sandy areas. All material came from the surface in the sandy areas or between the boulders; the sample consists of 52 chips, 47 potsherds, 10 projectile points, and a few unidentifiable fragments of shell and bone.

AU–3, as well as AU–4 and AU–10, are all 1.5 miles southwest of Deerfield, a small village in western Augusta County. The site is on the left (east) bank of Calfpasture River, 75 yards downstream from Daddy Run which enters the river on the same side. AU–3, 20 by 30 yards in extent, lies on a 2- to 3-acre bottomland, 8 feet above normal water level. The area was in sod at all visits, but in eroded patches a few chips and two points were found. No pottery was seen, and the predominance of chert among the chips indicates the position of the site in time as the preceramic "chert-using" period.

AU–3A. Fifty yards from the bank an irregular ridge parallels the river and rises 20 to 25 feet above the bottomland. Previously a small rock mound was on this ridge, 100 yards southeast of AU–3. It had been dug into by owners of summer "camps" scattered along Calfpasture River. Dr. Richard Bell, Jr., of Staunton, who reported the mound, says he had dug there and recovered only a few chipped-stone artifacts.

In recent years the mound has been bulldozed from its original position toward the east onto that side of the ridge nearest Daddy Run. In eroded spaces where the mound had stood, 89 chips were collected but no evidence of other artifacts or pottery.

The high percentage of chert places AU–3A as a preceramic "chert-using" station in the area of the mound.

AU–4 is 0.3 mile west of AU–3, but on the right (west) side of Calfpasture River. It is also 0.3 mile from the river with its eastern extent bounded by an unnamed creek. This creek parallels Calfpasture River for a mile after leaving Shenandoah Mountain to the north, and enters Calfpasture River below Corbett Branch which enters the river from the opposite (east) side. The site covers 3 to 4 acres of wide bottomland but occupational debris is concentrated along the unnamed creek. The bottomland has a series of low terraces and AU–4 is situated on the terrace farthest removed from the river. It is about 3 feet above the next terrace toward the river. Local collectors have observed that artifacts are not usually found near the riverbank but on these terraces, removed from the river.

This site is typical of the preceramic "chert-using" period. The majority of the rock material is blue chert, available in quantity on mountainsides nearby. Two collections were made 5 months apart from different portions of the site. They include 147 points or blades, 468 chips, 2 celts, and 2 drills. By coincidence, exactly the same number of chips, i. e., 234, were collected on each visit. No pottery was found at any time, although conditions for surface collecting were ideal.

AU–5 is 4.5 miles north of Staunton. Two local points for closer reference are Shutterly's (or Frank's) Mill on the right (south) bank of Middle River, 100 yards west of AU–5, and the State Highway 732 bridge crossing the river at its western limit. Occupational debris is concentrated on the left (north) bank 75 yards downstream from the bridge. Floods have washed away 12 to 18 inches of yellow, sandy topsoil and exposed a reddish-brown subsoil 10 to 15 yards adjacent to the river. River rocks, trash, and artifacts had accumulated into small piles and the majority of the reported material was troweled from these piles. The materials collected include 113 points and blades, 309 chips, 86 sherds, 2 drills, 2 celts, 4 scrapers, 2 steatite fragments, a few cores and fireburnt stones. Undoubtedly much, if not most, of the site lies under the cultivated field too deep to be touched by plow and too far from the river for flood erosion. Relatively few artifacts have been found in the cultivated field.

AU–6 is a rock shelter 1 mile west of AU–5 on the left (north) bank of Middle River. The floor of the shelter is 25 to 30 feet above the river. Only 1 potsherd was found; no other artifacts occurred.

AU–7. Quick's Mill, a very small community, is situated at the intersection of State Highways 626 and 612. One mile north of Quick's Mill on a small stream, known as Spring Run, is an abandoned marl quarry. The late Mr. Jordan, with his hired man, initially developed the quarry with shovel and sifter, saving the Indian "relics" caught by the sifter. Today, Mr. Jordan's daughter, a Mrs. Carroll, has them stored in her home, "Stone House," adjacent to the quarry. She made available for study the artifacts she could find at the time of my visit to the site. There were 12 sherds, 10 projectile points, 1 polished celt, 1 polished and grooved ax, and 1 atlatl weight. She assured me that only artifacts discovered in the quarry were present. If this be true it is the only site in the survey to produce a grooved, polished ax and an atlatl weight.

AU–8 is 3.5 miles southwest of Waynesboro on the left (south) bank of South River (into South Fork of the Shenandoah). The river is crossed by State Highway 632, a few yards north of the site. Although the area is an extensive plain, only 4 or 5 acres were under cultivation near the river. A crude greenstone celt, 1 point, and 49 chips were collected. No pottery was found. The predominance of quartzite chips assigns the site to the preceramic "quartzite-using" period.

AU–9. W. H. Plumb of Waynesboro kindly pointed out this site. It is 5.4 miles southwest of Waynesboro and 0.2 mile southeast of a

Norfolk and Western Railroad trainstop called Lipscomb. State Highway 635 has been built through the eastern limit of the site. Other local features of advantage in locating it are South River (into South Fork of the Shenandoah) 0.4 mile to the east at nearest approach and an unnamed creek 200 yards to the northeast. At all visits the land was under cultivation by the Waynesboro Nurseries.

The site is on the slope of a ridge rising from the unnamed creek. The collection was made in an area 50 by 100 yards fronting on State Highway 635 and included 51 points and blades and 178 chips. It is a typical preceramic "quartzite-using" station. A series of 18- to 24-inch-deep pits dug by the Nurseries for removal of fruit trees revealed large percussion-made chips, but in no instance did an examination of the walls of the pits indicate any artifacts below 8 to 10 inches from the surface.

Unfortunately, Mr. Plumb, who had collected surface material from this site for 15 years, could separate no more than two artifacts in his extensive collection as having been found here.

AU–10 is located on a wide bottomland extending from the right (west) bank of Calfpasture River along with sites AU–3 and AU–4 (p. 16). The site is 25 yards from the river and 50 yards downstream from the mouth of Staples Run which enters the river from the opposite bank.

Five projectile points and blades and 48 chips constituted the total collection. No pottery was found. The site belongs to the preceramic "chert-using" period.

AU–11, from one direction, is 1.25 miles north of Waynesboro. At this distance from Waynesboro a bend to the east in South River (into the South Fork of the Shenandoah) brings the river, Norfolk and Western Railroad, and United States Highway 12 in close proximity to one another. From another direction, AU–11 is 0.5 mile south of Dooms.

The western limit is 10 yards from the right (east) bank of South River. These 10 yards, at about water level, have been heavily eroded by the river, leaving a 2- to 6-foot-high terrace on which artifacts are found. The Norfolk and Western Railroad, running parallel to the river, cuts through the entire length of the site, a distance of 100 yards. The southern limit is an unnamed creek flowing into South River from the east. The site is 30 yards wide.

Three chip collections were made. Inspection indicated a concentration of chert in the middle of the site. Since this concentration was localized, it was believed that the other two collections, agreeing closely when broken down into percentage distribution of rock material, were representative of the site. In view of its uncertain significance, this chert collection was not included in the seriational studies. Materials collected include 216 points and blades, 274 chips, 45 sherds, 4 drills, 16 celt fragments, and several miscellaneous artifacts.

AU–12, located 3 miles east of Dooms in Jarmen's Gap, is within the limits of the Shenandoah National Park. All material collected, 15 points and blades, 221 chips, and 1 sherd, was turned over to Guy Edwards, Park Superintendent, for the National Park Service.

AU–13 is 2.75 miles southeast of Waynesboro, on the left (north) bank of South River (into South Fork of the Shenandoah). The western limit of the site is formed by State Highway 664. The general area is a fertile bottomland 200 yards wide. The 10 yards nearest the river have been flood eroded and no artifacts were found here. Floods have created a 1½- to 4-foot-high terrace which parallels the bank for 100 yards. On this terrace and for 40 yards north of the river, occupational material is scattered. Conditions for surface collecting were ideal because the land was in corn cultivation at each visit. There were no concentrations of cultural objects.

Jerry Brownlee, a lad of 10 who lives on part of the site, had collected from it and allowed me to make use of his finds. These are reported in the statistical tables as a part of the accumulated totals consisting of 161 points and blades, 281 chips, 34 sherds, 3 scrapers, 1 drill, 5 celts, 9 steatite fragments, and 4 miscellaneous artifacts.

AU–14 will be found at Dooms, a small hamlet north of Waynesboro. More exact location is the field in the U-shaped bend in South River (into South Fork of Shenandoah) south of State Highway 611. At the base of the river's U bend is a low dam. On the right (east) bank near the dam most of the artifacts were found. However, they were scattered over the entire field, 40 by 75 yards in size. The land had been in wheat and was not well prepared for surface collecting.

The occupational complex was thinly scattered and difficult to find, but the area is well known to local collectors who state that many artifacts have been discovered. Fourteen points and blades, 134 chips, 1 ax fragment, and 3 celts were found, but no pottery. The majority of stone artifacts are quartzite and the site belongs to the preceramic "quartzite-using" period.

AU–15 is 0.75 mile north of Dooms on the right (east) bank of South River (into South Fork of Shenandoah). This preceramic "quartzite-using" station is 20 by 30 yards, on a 10-foot bank overlooking the river. Undoubtedly, some of the occupational area was not observed, for the northern end was in grass; the part available to inspection was in corn cultivation.

The artifacts were thinly scattered and predominantly made of quartzite. Owing to circumstances, a chip collection could not be made. The artifact sample is quite small: 16 points and blades and

1 end scraper. However, the site does add further evidence to the profusion of preceramic "quartzite-using" stations along streams in the South Rivers district.

AU–16 is north of the hamlet of Harriston, which, in turn, is 9.5 miles north of Waynesboro. From Harriston northward State Highway 825 is parallel to the right (east) bank of South River (into South Fork of Shenandoah) and is placed 15 yards from the river. East of the highway is a wide bottomland extending to United States Highway 12. For 35 yards east of the State Highway and 0.1 mile downstream from Harriston scattered artifacts may be found, all belonging to a preceramic "quartzite-using" complex. At the northern limit of this 0.1 mile there is a concentration, 30 by 50 yards in extent, of artifacts belonging to this same complex. The land was excellently prepared for surface collecting, for it had been planted with corn and the sandy soil had been washed with rain. Large percussion-made chips were relatively abundant. Only one potsherd was found. Cores were not a prominent feature. The collection consists of 54 points and blades, 144 chips, and 1 scraper.

AU–17, another preceramic "quartzite-using" station, is on the property of the Waynesboro Nurseries at Lipscomb (see AU–9), on the left (west) bank of South River (into South Fork of Shenandoah) with the eastern extent formed by State Highway 635. The southern limit is 25 yards from South River, along a primitive road leading from Highway 635 to a group of houses on the Norfolk and Western Railroad. The site covers an area 50 by 75 yards.

A second site, AU–26, is east of Highway 635 and should not be confused with AU–17. AU–26 has a well-defined ceramic complex which AU–17 does not have. Careful search under ideal surface-collecting conditions during a number of visits to both sites indicated there was no overlapping or intermingling of the two different complexes.

Occupational material was thinly scattered and large percussion-made quartzite chips were prominent, with 62 points and blades, 245 chips, 1 drill, and 1 scraper obtained for study.

AU–18 is a site originally found by Howard MacCord who contributed his material to this study. It is located on the right (east) bank of South River (into South Fork of Shenandoah) 0.3 mile west of Crimora, a tiny hamlet on United States Highway 12. The northern limit of the site is set by State Highway 612 as it crosses South River. The land was in sod whenever I visited the area and the extent of occupation could not be determined with accuracy; however, it is probably not more than half an acre. The land, almost level with the river, has been subject to much erosion, and MacCord found much of his material following a flood. The cultural complex falls in the preceramic "quartzite-using" horizon. Thirty-seven points and blades, 3 axes, 6 celts, and 2 miscellaneous artifacts were available for analysis. In the overall pattern of this complex the presence of a chlorite pipe and 2 polished and 4 crude celts is not consistent. This combination of objects is generally found during the ceramic horizon. Although MacCord is a careful observer, he did not find any pottery.

AU–19 is on the property of Mrs. Gilpin Willson of Staunton. The site lies on a high terrace above the left (south) bank of Middle River 3.5 miles east of Fort Defiance. Mrs. Willson's small garden, on the edge of a broad grassy plain 15 feet above water level, was carefully searched without results, but she has found a modified steatite monitor pipe, a grooved ax, a polished celt, and a "hoe." It is possible more material will come to light when a larger section of the plain is cultivated.

AU–20, known as the Lewis Creek Mound, was built on a wide bottomland 10 yards from the right (south) bank of Lewis Creek and is 10 yards east of State Highway 792. At the present time, remains of the mound are 12 to 18 inches high and 42 feet in diameter. It is covered with sod except for several eroded places in which fragments of human bones are profuse. Dr. Betty J. Meggers, Dr. Clifford Evans, and I carried out a limited excavation in the remaining portion. The soil was black and hard packed. The portion above ground had been entirely disturbed by previous digging and many fragments of disarticulated skeletons were in evidence. Below the disturbed level a child's articulated, flexed skeleton was discovered, partially covered with rock slabs. No artifacts accompanied the burial. Several potsherds belonging to the Albemarle Series were found in the mound fill.

Destruction of the mound occurred about 30 years ago. As pieced together from stories of several individuals, the mound at one time was 6 feet high and about the diameter of the remains now (42 feet). One owner of the land carted off the top as a fill for part of his farm. Boys from Staunton discovered it and began to dig, one of whom, W. R. Brown, now associate professor of geology, University of Kentucky, Lexington, Ky., writes (personal communication, 1952):

> Several layers of bones, I'd guess 3 or 4, were uncovered. Between each layer there must have been 8 to 12 inches of dirt. I could only make a wild guess as to how many individuals were represented, maybe 5 to 15 in different layers, possibly totalling 30 to 40 individuals. Of course I was impressed with the number of bones at the time and the number may have been considerably less.
>
> It seems to me that about a dozen pipes were found. These were mostly of average size (3 by 5 inches) and ornamented. A lot of shell beads were found. Several Indians had chest ornaments (whatever they are called) made of thin tubes of bone (?). A fair number of black flint arrowheads were also found. The pipes as I remember them were made of dark, grey-green, well polished

soapstone. This could have come from numerous localities in the Piedmont, possibly from the belt extending from Albemarle County (Schuyler vicinity) southwestwards to Henry County or the Blue Ridge Plateau. My memory of these things is distinctly hazy. . . .

The final destruction of the mound was accomplished later by two pot hunters who sold and scattered the material so widely it has been impossible to trace it.

A small string of marginella beads, a few beads (?) made from the columella of conch, and several skulls are in the hands of a Reverend Mr. Glovier who lives a mile west of Lewis Creek Mound on State Highway 792.

AU–21 is on the right (east) bank of Middle River, 400 yards northeast of Fort Defiance Mill (also known as Damtown). The cultural remains are littered over an area 15 yards wide and 100 yards parallel to the river. If material had occurred in a 10-yard zone adjacent to the river, it has now been destroyed by floods and road building.

Howard MacCord discovered this site December 29, 1947, and such material as he collected was turned over to me for study: 26 points and blades, 90 sherds, 153 chips, 1 ax, 1 scraper, and 2 celts. Several visits to the site while under corn cultivation indicated an extremely scattered occupation.

AU–22 was also discovered by Howard MacCord who located it on the "left bank of Middle River east of United States Route 11" (MacCord, personal communication, 1951). An attempt was made to relocate the site without success. The material MacCord collected belonged to a preceramic "quartzite-using" complex. An area, entirely unsuitable for accumulating a satisfactory surface collection, was found with material similar to MacCord's, but whether this was MacCord's site is not known. The specimens consist of 6 points and blades, 1 scraper, and 1 pendant.

This site extends the areal distribution of preceramic "quartzite-using" stations slightly west of the South Rivers district concentration.

AU–23 is 1.1 miles east of Lofton on the left (southwest) bank of Pine Creek. This creek flows between low rounded hills and the occupational area is on a hillside 20 to 30 yards from Pine Creek. It covers an area 25 yards in diameter but undoubtedly is more extensive than this because artifacts were only found in the garden cultivated by Frank Seller. The remaining land had been planted in grass.

Howard MacCord discovered this site. His material was added to my collection. The entire artifact complex is a typical preceramic "quartzite-using" station: 86 points and blades, 149 chips, 1 scraper, 1 celt, and 1 steatite fragment. Quartzite cores and large percussion-made chips were abundant. A single potsherd was found but no other evidence of a ceramic complex.

AU–24, another site near Lipscomb, is 1 mile west of the village on the left (north) bank of South River (into the South Fork of Shenandoah). The small river forms a large U bend with the base to the south. The land in the U is level but interrupted by relatively broad, staggered terrace formations. A concentration of artifacts is at the western extreme of the U; the northern and western side of the concentration is formed by a curved, primitive farm road. It is 50 yards in diameter and 20 yards removed from the nearest approach of South River. Scattered artifacts of the same complex were found peripherally to the east.

The site was originally discovered by MacCord, and his material acted as a guide to later collections. Specimens collected include 149 points and blades, 100 chips, 7 axes, 3 celts, 2 drills, and 1 pendant. A total of 12 sherds indicated a limited resettlement by a small group with the pottery-making tradition. However, after careful study of the cultural complexes in the survey area it was felt this site belongs overwhelmingly to a preceramic "quartzite-using" tradition. Quartzite cores were frequent and large percussion-made chips predominate.

AU–25 was discovered by MacCord and reported in his survey for the Virginia Conservation Commission with the statement: "Quartzite and flint chips, rejects, etc.,—no pottery" (MacCord, 1947–48). AU–25 is 2.8 miles southwest of Waynesboro on a 40-foot bluff overlooking the right (south) bank of South River (into South Fork of Shenandoah). The occupational complex is concentrated 200 yards west of the entrance of Back Creek into the river. The top of the bluff is a plateau covered with grass but heavily eroded. In the eroded patches quartzite chips and artifacts have been uncovered; the collection for analysis included 50 points and blades, 121 chips, 1 sherd, 1 ax, 2 scrapers, and 1 graver.

Since chert (flint) occurs in percentages of 1.6 percent (for chips) and 6 percent (for artifacts) at the site, MacCord's reference to "flint chips" and "rejects" was investigated thoroughly. It was found that in the angle between South River and Back Creek, on a wide bottomland, there is a concentration of chert. This area is peripheral to AU–25 and is not represented in the collection.

The complex is typical of a preceramic "quartzite-using" station. The single sherd was found on the fringe of the site.

AU–26, Lipscomb (Evans, 1955, p. 19), was originally discovered by MacCord in his survey for the Virginia Conservation Commission (MacCord, 1947–48). Dr. Clifford Evans has described the site and material he collected in the course of his limited excavation. He found a small quantity of sherds and 1 Small Triangular Type A and

3 Triangular Type C projectile points. These have been included with my collection. Since the sherd collection was small, I revisited the site and extended his excavation to collect more material. A total of 149 sherds, 3 fragments of soapstone, 219 chips, and 16 projectile points was accumulated.

AU–26 is 50 yards east of AU–17 (vide supra) at Lipscomb on the left (west) bank of South River (into South Fork of Shenandoah). Evans (1955, p. 20) describes the site as follows:

> On the left bank of South River, opposite the community of Lipscomb, there is a high point of land rising 9 feet above the water level where Virginia Highway No. 635 crosses a small bridge over the river. The small habitation site was clearly visible as the highest spot along this part of the bank. Sherds were extremely sparse, but chips and points were scattered over an area 30 yards in diameter. Since the land was in permanent pasture, collecting was difficult; but sand pits permitted lateral troweling, which produced a fair quantity of archeological specimens. There is no question that the area was a site of only limited occupation. The artifacts were in a layer of light-gray soil extending from the surface downward for 6 inches. The bright-yellow sterile sand beneath yielded no cultural refuse.

AU–27, a rock shelter high above the left (north) bank of North River, is 0.1 mile northwest of Camp May Flather, a Girl Scout summer camp. The shelter is between a well-traveled, hard-surfaced road leading from Mount Solon to the Staunton Reservoir and an abandoned dirt road, both of which parallel the river.

The shelter, 8 feet wide, 6 feet deep, and 3 feet high, is formed in quartzite strata. Large and small natural spallings litter the level floor. On the surface a crude ax was found and excavation produced 1 point fragment, 81 chert chips, 1 chert core, 2 white quartz chips, 8 sherds, and 3 small unidentifiable fragments of animal bones.

AU–28 is a second shelter 15 yards southeast of AU–27. The roof is formed by a thick slab of quartzite on the upper surface of which is a circular depression. This depression is locally famous as the mortar in which Indians ground their corn. The shelter, 10 yards in length, 3 to 4 feet high, and 8 feet deep, has been partially blocked by a recent cave-in. The eastern half is clear and at the entrance 3 Stony Creek Series sherds and a few chert chips were found on the surface. Remains of a recent fire, probably made by deer hunters, littered the center of the floor.

Both shelters, AU–27 and AU–28, were discovered by Roy Roby of Staunton.

AU–29. Collections from this site were made by Charles Ramsey and Dr. Charles Callar. They collected independently, and neither knew of the other's collection. It is of interest to note the similarity between the two collections (see table 1).

TABLE 1.—*Comparison of two separate collections from AU–29 to show consistency of artifact types in random samples*

Projectile-point type	Chert		Quartz		Quartzite		Total	
	Ramsey	Callar	Ramsey	Callar	Ramsey	Callar	Ramsey	Callar
Triangular Type C	0	1	0	0	0	0	0	1
Stubby Barbed Type H	0	2	0	0	0	0	0	2
Notched Stemmed Type I	4	4	1	1	0	0	5	5
Ovoid Base Type J	1	1	0	1	0	1	1	3
Contracting Stemmed Type K	2	0	0	0	1	1	3	1
Parallel-sided Stemmed Type L	11	7	0	1	3	5	14	13
Side-notched Type M	6	0	0	0	2	0	8	0
Unclassified Type N	2	4	1	0	3	3	6	7
Eared Type O	0	1	0	0	0	0	0	1
Large Parallel-sided Stemmed Type Q	0	0	0	0	6	5	6	5
Large blades, unclassified Type V	0	0	0	0	0	2	0	2
Total							43	40

Greatest relative disagreement is in Side-notched Type M, which may be accounted for by the limited samples.

This site is on level land at the foot of Seidling Hill 150 yards from the right (north) bank of Calfpasture River. It is about equidistant (10 miles) from Deerfield and Goshen, on the opposite side of the river from a rugged valley known as Ramsey's Gap. On my visit I found the site completely covered by grass; hence it was impossible to determine the extent of the site, and a wide search was unrewarding except for a few chert chips.

AU–30. "Natural Chimneys," tall columns of limestone perforated at the bases by caves and tunnels, are located 1 mile north of Mount Solon, 150 to 200 yards east of the right bank of North River. In the process of excavating the tunnels to lay walks and steps, a series of artifacts were found and are on exhibit at the information office.

Among the preserved specimens are rodent-gnawed deer bones, a fragment of a "paint pot," a shell gorget 2½ inches in diameter with a center-drilled hole, an animal incisor tooth perforated for suspension, 1 fragmentary and 1 complete conch columella "bead," deer teeth, and several unclassified bones. In addition to the 22 points and blades analyzed, there are a polished celt and a crude ax; however this small sample tends to give an unreliable picture of the artifact complex.

The owner kindly allowed inspection of the tunnels and caves, but nothing was found but a small fragment of bone.

The cultural complex to which the stone artifacts belong is that designated as preceramic "chert-using."

AU-31 is located 1.25 miles southeast of Laurel Hill. It lies on the summit of an 80-foot cliff overlooking the broad, grassy plain of Middle River and Lewis Creek; the confluence of these streams is 0.2 mile to the west. Occupational refuse is concentrated from the very edge of the 25-yard bluff eastward to State Highway 612, a distance of 50 yards. At each visit the red-brown clay soil was in corn cultivation, and collecting conditions were ideal.

Occupational refuse was more localized and profuse at this site than any other encountered. There were areas 3 to 5 yards in diameter, in which village refuse was relatively concentrated. Here chips, artifacts of stone and clay, and fire-cracked rocks were observed. However, no charcoal stains were seen. An unusual feature is the prominence of polished celts. The collection included 96 point and blade fragments, 343 sherds, 117 chips, 5 drills, 1 scraper, 4 crude and 16 polished celts, and 1 stone pipe.

AU-32, located 1.1 miles southwest of Stuart's Draft, is 250 to 300 yards from the right (south) bank of South River (into South Fork of Shenandoah). A few yards west of the site flows a small stream known as John's Run. The general terrain is a broad bottomland, but 20 yards north of the site the land rises gradually until 4 or 5 feet above the river plain. Elevation of the land continues southward to form an irregular ridge. A low moundlike formation northwest of the site was excavated by MacCord who reported it to be a natural feature.

The light-tan, sandy soil was in wheat cultivation at each visit. Artifacts were extremely thinly scattered and no concentration was found. Only 10 points and blades, 1 sherd, 1 celt, and 98 chips were collected. However, the percentage breakdown of the chips indicates that the site belongs to a preceramic "quartzite-using" complex; the 1 potsherd and 1 polished celt are clues to possible resettlement by a group with pottery-making tradition.

AU-33 is 0.75 mile south of Stuart's Draft at the intersection of State Highways 610 and 608. The site lies on the northern slope of a 40-foot-high ridge, 150 yards from the right (south) bank of South River (into South Fork of Shenandoah). Occupational refuse is found on both sides of Highway 608, but more profusely to the west. The site undoubtedly extends south of Highway 610, but a house with a small lawn precludes surface hunting. The observable size is approximately 40 yards in diameter.

The sandy clay soil was in wheat but had been rain washed, and reasonably good surface-collecting conditions existed. Although three scattered potsherds were found, the stone refuse overwhelmingly belongs to a preceramic "quartzite-using" complex. The collection consists of 48 points and blades, 218 chips, 5 scrapers, 1 drill, 1 ax, and 1 hammer-anvil stone.

AU–34 is 0.3 mile south of Stuart's Draft, partially on the slope and partially on the plateau of a terrace 150 yards from the left (north) bank of South River (into South Fork of Shenandoah). The position of the site is similar to AU–33 on the opposite bank, south of AU–34. Large farms are under cultivation on the plateau of this terrace east and west of State Highway 608. Examination of a mile along the terrace indicated a scattered occupation by a preceramic "quartzite-using" culture. The only point of concentration of artifacts occurred 200 yards east of Highway 608. Here 3 points and blades and 2 scrapers were found. An insufficient quantity of chips precluded an analysis of these but they were predominantly quartzite.

AU–35 is a complex of three sites on the left (west) bank of Middle River 4.0 miles northwest of Staunton. The general area is a broad, grassy bottomland more than 2 miles in length. U. S. Highway 250 crosses Middle River 0.25 mile north of AU–35–M.

AU–35–M, a mound mentioned by Fowke (1894, p. 37) is known locally as the "East Mound," being on the property of John East, of Churchville. It lies 30 yards west of Middle River, and is one of the larger mounds still standing in Virginia, 55 feet wide, 45 feet long, and 2 feet high above the natural plain. The site was tested with three cuts (Holland, Evans, and Meggers, 1953). Burials were placed in a flexed position under an irregular layer of rocks. One burial was accompanied by a chlorite pipe and another by a pendant, a fragment of copper, and 3 Triangular Type C points (ibid., figs. 7, 8). A total of 35 potsherds were troweled from the black fill; 25 were Albemarle Series and 10 Radford Series sherds. The mound had obviously been built on an older village site, represented by the occupational refuse of AU–35–V–1.

AU–35–V–1 extends from the mound 100 yards south, parallel to Middle River. Undoubtedly it extends north of the mound but this could not be confirmed owing to coverage with pasture. Most of the gray-tan, sandy soil south of the mound was cultivated, and artifacts were thinly scattered from the riverbank over the bottomland, 50 yards to the west. It required several visits to build up a sherd collection. The limestone-tempered (Radford Series) sherds were leached, leaving small angular holes. Artifacts for analysis included 129 sherds, 172 chips, 44 points and blades, 2 drills, and 1 celt.

AU–35–V–2 is located 400 yards south of AU–35–V–1. An area 25 yards in diameter, 10 yards from the river, on a low terrace, contained occupational debris. The character of the complex was very similar to AU–35–V–1, but it was felt that seriating the material from the two sites separately might show time differences. (See figs. 5 and 8, and p. 61). Thirty-nine points and blades, 62 sherds, and 132 chips were collected for analysis.

AU–36 is 16.5 miles northwest of Staunton in the small community of Lebanon. For more precise local reference, it is in the northwest angle formed by the intersection of U. S. Highway 250 and State Highway 272. The western limit of the site is 10 to 15 yards from Broad Draft and the southern limit is 150 yards from the right (north) bank of Calfpasture River. The cultivated field containing occupational refuse is 1.0 to 1.5 feet higher than Broad Draft and 3 to 4 feet higher than the bottomland adjacent to Calfpasture River. The site is 10 to 15 yards wide in an east-west direction and 25 to 30 yards long in a north-south direction.

No pottery was found after careful search, but 110 points and blades, 168 chips, and 3 scrapers were collected, with the site representing a preceramic "chert-using" station.

AU–37 is a small site in Deerfield Valley, 200 yards north of the right bank of Calfpasture River and 10 yards west of Halloway Draft. Tisdale Branch is 50 yards west of the site. The land, which slopes gently and evenly to Calfpasture River, was under corn cultivation by the Polka-Dot Farms, owners of the land.

The occupational refuse consisted of 6 points and blades and 36 chips, mostly chert. This quantity of material represents a very limited occupation. Since no pottery was found, the site was occupied undoubtedly by a group with a preceramic "chert-using" complex.

AU–38, located 1.1 miles east of Lofton, lies on a ridge north of AU–23, 25 yards from the right (north) bank of Pine Creek. The site, covering 20 by 40 yards on the summit of the ridge, is 25 feet higher than Pine Creek. The yellow sandy loam was planted with corn and had been washed by rain, making conditions for surface collecting excellent. No trace of pottery was found. The material was thinly scattered and large percussion-made chips of quartzite were in the majority; the collection included 48 points and blades, 132 chips, and 1 drill. A family named Langhorne owns the land and has made a limited collection. Three artifacts, definitely known to have been found on the site, were incorporated in the analysis.

The cultural complex indicates a preceramic "quartzite-using" station. The material is similar in all respects to that found at AU–23.

AU–39. Howard MacCord informed me he had found large percussion-made quartzite chips and a few artifacts 1.75 miles south of Lofton in front of Mount Joy church. The land was not cultivated but overgrown with weeds and grass. A single brief visit located 2 unclassified quartzite blades and 43 quartzite chips, the majority of which were large and made by percussion. This meager evidence points to a continuous geographical occupation in the South Rivers district by groups having a preceramic "quartzite-using" complex.

AU–40. The boundary between Augusta and Rockbridge Counties crosses this site 1 mile northeast of Vesuvius and 1.5 miles southeast of Steeles Tavern. It lies on a gentle slope from Groah's Ridge 0.2 mile from the left (southeast) bank of South River (into James). The western limit, a steep bank, is crowned by the Norfolk and Western Railroad and a primitive dirt road. It is 100 by 35 yards in size.

The slope is a tan, sandy-clay soil permeated with rounded river pebbles. The occupational refuse contained no pottery, but large angular cores of quartzite were frequent and large percussion-made chips were prominent. The collection includes 76 points and blades, 126 chips, 2 axes, 2 scrapers, 1 celt, and 1 graver. The cultural complex is typically preceramic "quartzite-using."

AU–41 is on the left (northeast) bank of McKittrick Creek, a tributary to Middle River through Jenning's Branch, 1.5 miles west of Lone Fountain. State Highway 720 crosses McKittrick Creek at the eastern edge of the site. A deeply rutted plain from overflow of the creek lies to the northeast. The soil is sandy and was planted with wheat during several visits. Artifacts, found on the low, level, cultivated land, were thinly scattered over an area 20 yards in diameter. Undoubtedly much of the site has been eroded away by floods. The material collected for analysis includes 51 points and blades, 99 chips, and 4 scrapers. This cultural complex belongs to that of a preceramic "chert-using" station. Four potsherds indicate a very limited resettlement by a small group with a ceramic complex.

AU–42, 0.5 mile northeast of the intersection of State Highway 272 and U. S. Highway 250 where AU–36 is found, lies on a wide bottomland 50 yards from the right (west) bank of Calfpasture River. Northwest of the site are ridges from the Pinnacle of Bald Knob. The east-west length is 100 yards and the width does not exceed 10 yards.

The occupational material is so thinly scattered that very close observation of the plowed, sandy field was necessary to find it. The collection consists of 20 points and blades, 120 chips, and 4 sherds. The stone artifact complex falls predominantly into a preceramic "chert-using" period; the 4 potsherds suggest a possible resettlement by a group with a pottery tradition.

AU–43, 0.5 mile northeast of Verona, where U. S. Highway 11 crosses Middle River, is 100 yards west of the bridge and 20 yards from the right (south) bank of the river. It is 10 by 20 yards in extent and lies on a 4- to 5-foot terrace formed by erosion of a small unnamed creek and Middle River. The tan, sandy-clay soil was in corn cultivation. The collection consists of 63 points and blades, 211 chips, 6 sherds, and 2 miscellaneous items.

A preceramic "chert-using" complex is mainly represented by the refuse, but the 6 potsherds and 1 Small Triangular Type A point indicate a possible later resettlement, which was probably brief.

AU-44, on the same side of Middle River as AU-43, is 400 yards east of U. S. Highway 11 bridge and 0.5 mile northeast of Verona. The general area is an extensive bottomland of sandy soil, usually under wheat cultivation. Occupational refuse was littered for 50 yards along Middle River and 20 yards inland. It was discovered after a flood had eroded two channels, 3 to 4 feet deep and 30 yards inland. On the gray clay hardpan base of the channels and in the sandy soil of the channel banks a relatively large sample of pottery and chert chips was collected; stone artifacts, other than chips, were scarce.

It was evident that material in the base of the channels had been washed from a more superficial zone. To test this observation a pit 2 feet square and 2 feet deep was dug 25 yards west of the channels and 5 yards from the river. All dirt was sifted through a quarter-inch-mesh screen. Potsherds were encountered in the upper 8 inches but none below this level. The ceramic assemblage was better preserved and in larger fragments than from any other site. The total collection for study consisted of 15 points and blades, 111 chips, 1 pendant, 1 crude limestone ax, and 260 potsherds.

AU-45 was discovered by Roy Roby of Staunton, 4.75 miles north of Staunton on the left (west) bank of Middle River. A closer point of reference is Shutterly's (Frank's) Mill, 1 mile to the southwest (see AU-5). On the opposite side of Middle River is an ancient stone house served by a ford from State Highway 732.

The site is situated on an extensive sandy bottomland, 10 yards from the river and 6 to 8 feet above water level. The approximate middle of the site is marked by a low knoll containing cracked bricks and molten glass from a burned house. The width of the site is 10 to 20 yards and it is 100 yards long.

Occupational refuse, somewhat concentrated near the knoll, is thinly scattered, and close examination of the cultivated field was necessary. The pottery sample of 141 sherds is composed mainly of small, eroded fragments. One of the better assemblages of chipped-stone artifacts in the ceramic horizon came from this site, represented by 132 points and blades, 128 chips, 4 drills, 1 scraper, 2 celts, 2 hammer-anvil stones, and 1 pendant.

AU-46 is on a 35-foot bluff overlooking the left (northwest) bank of Middle River, 1 mile northeast of AU-45 (vide supra); State Highway 732 is 50 yards northwest of the site. The bluff is the river end of an irregular ridge.

The hard reddish clay soil was mostly in grass, but a small segment on top of the bluff was in wheat cultivation. Occupational refuse came from a 10 by 20-yard area, partly in the cultivated zone and partly in eroded spots along the bluff. Only 11 sherds and 22 chipped stone artifacts, 2 hammer-anvil stones, and 132 chips were recovered.

AU–47 occupies a narrow, cultivated bottomland opposite AU–46. Observation of the sandy flat shows it has been subject to much erosion by floods. One area, 10 by 15 yards in extent, at the base of a low ridge, is one foot higher than the surrounding zone. On this elevated spot, 2 points, 2 drills, 2 hammerstones and 32 chips, mostly chert, were recovered.

AU–48 is on the southwest slope of Bell's Creek Valley, 3.5 miles northwest of Staunton with U. S. Highway 250 forming the northeastern boundary. On a narrow terrace, 40 to 60 feet above and 0.1 mile southwest of Bell's Creek, occupied by houses and lawns, occupational debris was found. It was concentrated in an area 10 yards in diameter which was in the process of being planted with grass. The reddish-tan soil disturbed by plowing was, at no time, satisfactory for surface collecting. In spite of this, an assemblage of 17 chipped-stone artifacts and 210 chips was recovered. The distribution of chipped-stone artifacts and the presence of a high percentage of chert chips, in the absence of pottery, indicate the site was occupied by a group with a preceramic "chert-using" complex.

AU–49 was discovered in August 1952, the final survey month, with the result that the collection is very limited. It has the possibility of being a productive site. AU–49 is 0.8 mile northwest of Laurel Hill on the right (south) bank of Middle River. Middle River forms a wide U with the base of the U to the west. The low, sandy bottomland had been newly plowed and collecting conditions were not satisfactory. The occupational area extends 25 yards along the bank and 75 yards to the south (inland). A few potsherds, 32 chert and 14 quartz chips, and 1 quartzite chip were the total finds at this first inspection.

BATH COUNTY

BA–1 is a small cave or rock shelter 1 mile northwest of Millboro Springs and a quarter of a mile northwest of Windy Cove Church, on the left (northeast) bank of Cowpasture River. The cave, fronting on U. S. Highway 39, has three sections, of which only the eastern was investigated. This section, 8 feet 3 inches wide, 5 to 6 feet high, and 18 feet long, slopes gradually upward to meet a larger cave higher in the cliff. Across the entrance a trench 5 feet long, 2 feet deep, and 1.5 feet wide had been dug before we arrived and the dirt sifted through a screen. It was decided to extend this excavation from wall to wall and increase the depth to hardpan. This was done and the posterior wall freshened to see if stratification existed. It was found that the upper 10 inches was yellow clay resting on a charcoal layer 2 inches thick. Below this was 7 inches of dark-gray sandy soil. The lowest 21 inches was gray-black soil resting on the hardpan.

The cave was excavated in 8-inch levels, passing all the dirt through a quarter-inch-mesh screen. During the excavation an oval pit 28 inches deep, 3 feet wide, and 4 feet long was discovered. The material, analyzed by levels, was homogenous from top to bottom. All the pottery (57 sherds) was of the Radford Series. All rock material was natural spallings from chert inclusions in the cave, except two chipped-stone artifacts. A single kernel of charred corn and two walnut hulls came from the lowest level of the pit. There was also one antler projectile point.

The analysis of the animal and bird bones and shells by the United States National Museum follows:

Animals (identified by Henry W. Setzer):
- Beaver (*Castor canadensis*)
  - 2 teeth
  - 1 atlas
- Deer (*Odocoileus virginianus*)
  - 2 teeth
  - 2 ulnae
  - 1 toe bone
  - 1 patella
- Marmot (*Marmota monax*)
  - 1 mandible
  - 1 tooth
- Gray squirrel (*Sciurus calolinensis*)
  - 2 mandibles
  - 1 tibia
  - 1 innominate
  - 1 femur
  - 1 calcaneum
  - 1 vertebra
- Woodrat (*Neotoma* sp.)
  - 1 humerus
  - 1 tibio-fibula
- Rabbit (*Sylvilagus floridanus*)
  - 1 innominate
  - 1 scapula
  - 1 ulna
  - 1 vertebra
- Carnivora
  - 2 canine teeth
- 310 unidentifiable fragments which would probably be referable to deer for the most part

Birds (identified by Herbert W. Friedmann):
- Wild turkey (*Meleagris gallopavo*)
  - 2 vertebrae
  - 1 fragmentary carpometacarpal
  - 1 fragment of a tibiotarsus
  - 1 fragment of a tarsometatarsus
  - 18 unidentifiable fragments, possibly pieces of turkey skull

Shells (identified by Joseph P. E. Morrison):
- *Elliptio complanatus* (Slonader)
- *Mudalia carinata* (Bruguiere)
- *Triodopsis albolarbris* (Say)
- *Triodopsis tridentata juxtidens* (Pilsbry)
- *Mesodon thyroidus* (Say)
- *Anguispira alternata* (Say)
- *Ventridens ligera* (Say)
- *Haplotrema concavum* (Say)

HIGHLAND COUNTY

HD–1 is a small rock shelter in a limestone cliff on the right bank of Straight Creek, 6 miles northeast of Monterey. The level floor, composed of brownish leaf mold and dirt, is 7 feet above water level impounded behind a sediment-filled, mossy dam. Excavation revealed no cultural objects although numerous animal bones, principally rodent and deer, were taken from the upper 6 to 10 inches. Natural chert spallings were frequent; no positively identifiable man-made chips could be found.

It can be argued that the bones are the results of white man's activities; however, the profusion, types, preservation, and depth of the deposit are indications of aboriginal origin. It is unfortunate that no means of assigning this assemblage of bones to a time period was discovered.

HD–2 is 2 miles northeast of Mustoe and 6 miles south of Monterey, near the headwaters of Dry Branch, a tributary to Jackson River. It lies on a level, plateaulike ridge extending from Sounding Knob, 40 feet above and 40 yards from the right (west) bank of Dry Branch. Mrs. Ralph Trimble, Chapel Hill, N. C., owner of the land, had the entire section in sod for grazing purposes. It was visited through the courtesy of her brother, Frank Terry, Monterey, who stated that the site had been dug into many times and that pottery and deer antlers had been removed from it.

The site, 12 to 18 inches high and 18 feet in diameter, rests on the southeastern side of the plateau, and was covered with sod. Three test trenches demonstrated that the black soil, filled with hundreds of small shells, did not extend more than 6 to 10 inches below the sod, and owing to previous digging, had no undisturbed stratification. The black fill was permeated with fire-cracked stones, charcoal, pottery, shells, animal bones, chips, and projectile points, with the collection including 8 points, 86 chips, 5 miscellaneous objects, and 88 sherds. No human bones were in evidence. The character of the structure was that of a midden.

A list of mammal and bird bones and shells identified by the United States National Museum follows:

Animals (identified by Henry W. Setzer):
- Deer (*Odocoileus virginianus*)
    - 4 vertebra
    - 2 humeri (distal ends)
    - 1 humerus (proximal end)
    - 1 scapula
    - 1 innominate
    - 1 femur (distal end)
    - 1 femur (proximal end)
    - 2 calcanea
    - 1 exoccipital
    - 4 toe bones
    - 5 metapodials
    - 1 ulna (proximal end)
    - 1 patella
    - 2 os petrosi
    - 1 tooth

Rabbit (*Sylvilagus* sp.)
    1 mandible
Marmot (*Marmota monax*)
    1 femur
    1 tibia
Chipmunk (*Tamias striatus*)
    1 mandible
    1 humerus
    1 tibia
Gray fox (*Urocyon cinereoargenteus*)
    1 mandible

Birds (identified by Herbert W. Friedmann):
    Melagris gallopavo (wild turkey)
        1 fragment of a sternum

Shells (identified by Joseph P. E. Morrison):
    Elliptio complanatus (Solander)
    Mudalia carinata (Brugiere)
    Mesodon sayanus (Pilsbry)
    Triodopsis fraudulenta (Pilsbry)
    Mesomphix cupeus (Rafinesque)
    Triodopsis tridentata juxtidens (Pilsbry)
    Heliodiscus parallelus (Say)

80 unidentifiable fragments of which the majority would probably be referable to deer

Mr. Terry stated there were three such structures on the plateau, but only one was located. Along the western embankment of the ridge, black soil, chert chips, several triangular points, and sherds of pottery were found on the surface. It could not be determined whether this had been thrown here in destruction of the midden or was part of a second midden.

HD–3 is on the right (west) bank of Dry Branch in the valley below HD–2. Along the base of the ridge, 10 yards from and parallel to Dry Branch, are an abandoned, primitive road and shallow gullies formed by erosive floods from Dry Branch. From these ground features came an artifact assemblage of an entirely different complex from that of Site HD–2 on the plateau. There were no potsherds, cracked stones, charcoal stains, or bones. Among the 16 chipped-stone artifacts, not one was triangular, the only type found on the plateau. For study, 105 chips were collected. It is believed that this site represents a preceramic horizon, belonging to the "chert-using" cultural complex.

HD–4, at the intersection of the Burnsville-Williamsville-McDowell roads, 10 miles southwest of McDowell, is on a 10-foot terrace 200 yards from the right (west) bank of Bullpasture River. At the base of the terrace bank runs the Williamsville-McDowell road, and 20 yards northwest of the area with occupational refuse are abandoned farm and outbuildings. An acre of the gray, sand-clay loam was in corn cultivation while the remainder was in sod.

The 101 chipped-stone artifacts and 186 chips, predominantly blue chert, have a trait complex similar to that found in Augusta County on preceramic "chert-using" stations. Only two potsherds indicate a possible very limited resettlement by a group with a ceramic complex. In addition, eight scrapers came from the site.

HD–5 is located on a plain south of the Burnsville Highway and 200 yards northwest of HD–4. An unnamed creek, close to and parallel with the Burnsville Highway, flows eastward into Bullpasture River. It lies 10 yards north of the site. Occupational refuse was found in a newly cultivated patch an acre in extent. The artifacts were thinly scattered and scarce: 4 points, 39 chert, and 2 quartzite chips. There was no evidence of pottery.

This small assemblage is believed to show a limited occupation by a preceramic "chert-using" group whose cultural complex is similar to HD–4.

HD–6 is in the very small community of Headwaters, 0.25 mile from the left (east) bank of Shaw's Fork, a tributary to Cowpasture River. A Protestant church and U. S. Highway 250 form the northern limit. The entire region slopes to Shaw's Fork from Shenandoah Mountain. At the western edge there is a sharp, 4-foot embankment parallel to Shaw's Fork.

Only 11 points, 1 scraper, and 116 chips were recovered. The heavily rock-strewn clay soil contained the remains of the previous year's corn-crop stubble and weeds and had been generously washed by rains, making collecting and observation conditions excellent. No pottery was encountered. The material belongs to a preceramic "chert-using" complex.

HD–7, within the town limits of McDowell, is on the right (west) bank of Bullpasture River. At the northern limit is the intersection of U. S. Highway 250 and State Highway 269. In close proximity, to the west, is a school and play yard. The eastern limit is a 2- to 3-foot sloping bank of the low terrace on which occupational debris is scattered 20 yards from the river. The area covered by refuse is 10 to 20 yards in diameter.

The rock-strewn, sandy soil was planted in corn. No pottery was discovered. The cultural traits, defined by the 34 chipped-stone artifacts and 126 chips, place the site among the preceramic "chert-using" stations.

HD–8 extends from the left (east) bank of Bullpasture River over a narrow belt of plain. The riverbank, 8 feet high, is strewn with chert chips and an occasional artifact. The home of Emery Lockridge, his lawn, and farm cover the occupational area which is situated directly east of the intersection of the Burnsville-Williamsville-McDowell roads.

Unfortunately, at the time of the survey no collections were made; however, it is potentially a productive site, worthy of future exploration.

HD–9, Clover Creek Mound, was excavated and described by Fowke (1894, pp. 31–32), but he was not the only one to dig here. C. H. Graham, aged 85, who lives within a mile of the mound, informed me he made an excavation in the mound and recovered "bushels of pottery and bones" for George Revercomb who owned the property at the time of Fowke's visit. The land is now owned by Mrs. Bessie Bradshaw.

The mound at present is 18 to 24 inches high, 35 and 50 feet in width and length, covered with grass. Two small test pits, dug to a depth of 18 inches, produced scraps of leached, limestone-tempered Radford Series pottery and fine fragments of charcoal.

In response to a request, Evans analyzed the pottery in the collections of the United States National Museum from Fowke's excavations, and reports (personal communication, 1952): "There are 156 sherds of Radford Cordmarked and 1 sherd of Radford Series Plain, representing, at most, 15 vessels."

ROCKINGHAM COUNTY

RM–1, located on the left (west) bank of the South Fork of the Shenandoah River, is 0.1 mile east of the mouth of South River. Other local points of reference are Port Republic and the State Highway 865 bridge 0.2 mile to the west. Here, a wide sandy plain, 10 to 15 feet above the river, extends to the northwest. Artifacts were recovered for 100 yards along the riverbank and 35 yards inland. The present owner, a Mr. Alexander, estimates 5,000 stone specimens have been found in the past, but this is undoubtedly an overestimate.

The land, under wheat and corn cultivation, presented good surface-collecting conditions. The entire stone assemblage of 72 points and blades, except for 1 Medium Triangular Type B chert point, was the result of occupation by a group with a preceramic "quartzite-using" complex. Three axes, 2 scrapers, 1 chloritic schist pipe, and 1 pendant also came from the site.

RM–1A is an area of RM–1 where a different assemblage of artifacts was found. It is by the riverbank on an eroded slope covering an area 10 yards in diameter. This chip collection of 224 specimens has a predominance of chert as compared with the low percentage of this material on the preceramic site. Without any doubt this area represents another occupation of the region, quite independent of RM–1.

RM–2 is 0.5 mile west of RM–1 on the north bank of combined North and Middle Rivers. A steep ridge with an abandoned stone quarry at its base separates the long grassy plain, along the bank of which artifacts were found, from State Highway 865 bridge, which crosses the combined rivers 0.3 mile to the east. The occupational refuse was found 30 yards from the river, the intervening slope being deeply channeled by overflow from the river. The crest of the plain is fully 15 feet above present water level. The bank from which artifacts had been eroded is composed of red-brown clay, 20 to 30 yards in east-west length.

The scarce material, 10 chipped stone specimens and 120 chips, predominantly quartzite, reflects an occupation similar to RM–1, that is, a preceramic "quartzite-using" station.

RM–3, Madison Run Rock Shelter (Holland, 1953), is within the Shenandoah National Park boundaries 2.5 miles east of Grottoes. Ten feet wide, 5 feet deep, and 3.5 to 4 feet high, it is formed in strata of quartzite and faces on Madison Run. This shelter was excavated under the supervision of J. C. Harrington, archeologist for Region Number 1 of the National Park Service. The reader is referred to the published report for complete details, but the findings, in brief, were limited to the upper 6 inches of the relatively level floor and belonged to a preceramic horizon. The collection included 31 points and blades. One sherd of pottery was also found, apparently of a later occupation.

RM–4 is a complex of sites discovered 1.2 miles northeast of Port Republic on the left (northwest) bank of the South Fork of the Shenandoah River. The first area encountered was opposite the western end of a large unnamed island in the river. This area has been designated RM–4.

RM–4 extends 100 yards downstream from an abandoned house and farm road leading to the river. A narrow plain lies between an 8-foot bank at the river edge and a low ridge parallel to the river to the northwest. Refuse was confined to a 20-yard belt along the bank. There were places, 10 yards in diameter, in which fire-cracked stones and artifacts appeared to be concentrated. The collection of materials for analysis consisted of 99 points and blades, 140 chips, 12 celts, 1 drill, 2 miscellaneous objects, and 350 sherds.

RM–4A lies on a narrow plain 25 yards southwest of RM–4. The intervening land was obscured by high weeds and undergrowth. Careful examination of the two sites disclosed an extension of RM–4, having a ceramic complex, to RM–4A, a preceramic "quartzite-using" station. Some 20 sherds of pottery were found in the overlapping zone as well as a small sample of triangular projectile points. Use of chip collections to separate a ceramic complex from a preceramic complex is well illustrated on RM–4A. Three collections, one from the overlapping zone, one in the middle of RM–4A, and one at the extreme southwestern end of the site were gathered. These have been shown in table 2 with the collection from RM–4 at the top.

TABLE 2.—*Rock type analysis of chip collections from the complex of sites around RM–4*

	Chert		Quartz		Quartzite		Greenstone		Total	
	Number	*Percent*	*Number*	*Percent*	*Number*	*Percent*	*Number*	*Percent*	*Number*	*Percent*
RM–4	112	80	21	15	6	4.3	1	0.7	140	100
Overlapped zone	73	50	13	8.8	59	40	2	1.2	147	100
Middle RM–4A	54	35.8	15	9.9	80	53	2	1.3	151	100
Distant zone of RM–4A	18	14.5	21	17	85	68.5	0	0.0	124	100

There is a progressive loss of chert and a proportional gain in quartzite with increasing distance from RM–4. It is believed that the resettlement of the preceramic site by a group possessing a ceramic complex distorted the patterns of both to such a degree that the point and blade collection of RM–4A could not be used in the seriation and was, therefore, thrown out of this part of the study even though it had an assemblage of 240 points and blades and 17 other artifacts. Although originally it was thought that the point and blade collection of RM–4 had been unmixed and represented one cultural complex, efforts to seriate it in the various sequences proved otherwise. For this reason the collection of stone artifacts could not be used. However, the pottery sample does represent one group and is used even though it is impossible to separate the proper points and blades from the collections of RM–4 and RM–4A.

RM–4B presented an entirely different situation from RM–4 or RM–4A. This site lies on a 6- to 8-foot terrace northwest of RM–4A and is separated from it by a sterile, shallow, dry channel 15 yards wide and 35 yards from the river. The complex, recovered from 50 by 30 yards of sandy clay soil in corn cultivation, had only traits assignable to a preceramic "quartzite-using" station. This collection included 88 points and blades, and two chip collections totaling 286 specimens.

RM–5, RM–6, and RM–8 are a series of sites in close proximity having a similar preceramic "quartzite-using" pattern. They are located 1.5 to 1.75 miles south of the highway bridge at Island Fork across the South Fork of the Shenandoah, on the right (east) bank. State Highway 642 has been built atop the 15- to 20-foot riverbank and acts as the western limit of the sites. To the east is a sandy clay plain over a mile wide.

RM–5 is on the property of a Mr. Harrison and is the most northern of the three sites. Cultural debris is very thinly scattered and only 13 points and blades, 78 chips, a crude ax, and 1 graver were found.

The cultural traits shown by these artifacts plus the chip collection place the site in the preceramic "quartzite-using" complex.

RM–6 is 0.25 mile south of RM–5 on the property of a Mr. Sipe, who states that a rock mound stood within a few yards of his home but was carted away in the late 1800's. The only specimen preserved after the destruction of the mound is a right-angle chlorite pipe. Thirty-nine points and blades and one scraper were recovered. No special features were present. The site is 35 yards in diameter. Chips collected totaled 160.

RM–7 occurs at the small community of Lynnhaven, 200 yards from the right (east) bank of the South Fork of the Shenandoah River. The southern limit of the site is delineated by a spur of the Norfolk and Western Railroad and State Highway 659, the former serving a flour mill on the riverbank, the latter crossing the river north of the flour mill. The western limit abuts on a dry 5- to 6-foot channel which parallels the course of the river. The northern limit is the owner's home and lawn. The eastern extent is 20 yards from the dry channel.

The occupational refuse, thinly scattered over the whole area, was a little more abundant adjacent to the channel. Collecting conditions were excellent; the tan clayey soil had recently been plowed and washed by rain. Analysis of the 42 points and blades and 184 chips reveals another preceramic "quartzite-using" station. One unclassified sherd, apparently of later occupation, came from the site.

RM–8, 50 yards north of RM–6 and between RM–6 and RM–5, is separated from the latter by fields of weeds and grass. Collecting conditions on this site were excellent, as they were at the others, the field being planted in corn and recently washed by rain. It extends 125 yards along the road front and 25 yards to the east. Occupational refuse was scattered evenly and thinly over the entire area. The collection consisted of 149 points and blades and 201 chips.

RM–9 is 1.5 miles northwest of Weyer's Cave, a village on North River. It lies on the left (north) bank of North River between State Highway 690 and the river, and 0.75 mile west of the intersection of State Highways 690 and 276.

The site is now in a 6-foot deep gully eroded through sand to a reddish clay hardpan. Small piles of sand left by the river were troweled, producing 4 sherds of unidentified pottery, a crude ax, 2 points and blades, and 29 chips. Unfortunately, the position of this site in the cultural sequence cannot be determined by this limited collection.

RM–10, within the corporate limits of Grottoes, lies on the right (east) bank of South River which flows into South Fork of Shenandoah. The 10 by 20 yards of sandy soil containing thinly scattered refuse is

10 yards from the riverbank. Undoubtedly the site is more extensive than this. The collection consisted of 3 points and blades and 55 chips. No pottery was noted. This assemblage is evidence that the area was used by a preceramic "quartzite-using" group.

RM–11 is located on a 10- to 15-foot terrace between the South Fork of the Shenandoah River and U. S. Highway 12, 6.5 miles southwest of Elkton and 1.25 miles southwest of the bridge at Island Ford. The river flows 100 yards to the west, and the intervening land is a low, flat flood plain covered with sod. At the foot of the terrace embankment is a shallow channel filled with flood water. The eastern boundary is fixed by the Norfolk and Western Railroad laid in close proximity to U. S. Highway 12. The north-south length is 200 yards, without definable limits, owing to undergrowth and grassland.

Collecting conditions were favorable with the clayey, rocky soil plowed for corn cultivation and washed with rain, permitting the accumulation of 31 points and blades, 130 chips, 2 scrapers, 2 steatite fragments, and 1 sherd. The cultural material falls into the preceramic "quartzite-using" horizon.

RM–12 is on the right (east) bank of the South Fork of the Shenandoah River, 0.5 mile southwest of the bridge at Island Ford. The abrupt bank is 15 to 20 feet high, topped by State Highway 642. Occupational refuse was found 10 to 20 yards east of the road on a gentle slope of sandy soil in corn cultivation. It also extends 100 yards along the road.

Mr. Sellers, owner of the land, had a small collection which was analyzed and incorporated into the tabulated summary of artifacts, making a total of 82 points and blades, 193 chips, 1 ax, and 1 scraper. The artifacts, entirely stone, belong to a group having a preceramic "quartzite-using" complex.

ROCKBRIDGE COUNTY

RB–1. This site, contributed to the survey by Howard MacCord, is described (personal communication, 1951) as: "Field just east of Wade's Mill at Brownsburg, Virginia." It was not revisited. The few objects in his collection indicate a station with a preceramic "quartzite-using" complex.

RB–2, Hayes' Creek Mound, was excavated by Mr. Valentine for the Valentine Museum (Valentine Museum, 1903). It is located 2.2 miles northeast of Rockbridge Baths on a broad, sandy, grass-covered plain south of the confluence of Walker and Hayes' Creeks. It has been reduced to an almost unrecognizable feature, its outlines blurred, and at the southwestern side it is only about 18 inches high. Today, a telephone pole rises from it. In order to confirm the location a small test pit was dug and fragments of a long bone and a skull were located. The soil below the sod was black.

The material removed from this mound by Valentine was largely skeletal but he also reports finding a few sherds of pottery. A visit to the Valentine Museum was unsuccessful in relocating these specimens.

RB–3 was discovered by inspecting the opposite (right or northwest) side of Hayes' Creek from the mound. Here the grassy plain is narrower and had been superficially eroded by floods, the eroded sections extending 25 yards from the creek and 100 yards along it.

Potsherds, chipped-stone artifacts, and chips were strewn between clumps of grass and as many as could be located in a limited time were collected: 19 points and blades, 140 chips, and 22 potsherds. The probabilities are that the Hayes' Creek Mound had been located near or on an older village site, similar to the situation at AU–35.

RB–4 lies within the limits of the small town of Rockbridge Baths immediately east of the intersection of U. S. Highway 39 and State Highway 602. The southern limit is U. S. Highway 39 which has been built on top of a 30-foot cliff formed by North River (into James). A broad sandy plain extends from the river northeastward. In a 10-by-25-yard area, 3 points and 30 chips were located. Of 25 quartzite chips, 22 were purple Erwin quartzite.

In the absence of pottery and the high percentage of quartzite this site probably is a preceramic "quartzite-using" station.

RB–5 is on the right (northwest) bank of Calfpasture River 1.5 miles southwest of the Augusta-Rockbridge County line. State Highway 600 has been built in close proximity to the riverbank and forms the southeastern limit of the small site. The first spring plowing had deeply cut the sandy farmland and exposed, over an area 10 by 30 yards, the following material: 4 points, and 35 chert, 3 quartz, and 3 quartzite chips. In the total absence of pottery this is probably another preceramic "chert-using" station.

RB–6 was discovered immediately southwest of the intersection of U. S. Highway 39 and State Highway 600 on a gradual slope to Mill Creek which is 35 yards to the southwest. Goshen is 2 miles to the southeast.

The sand-clay soil was partly in corn cultivation, and topsoil had been partly bulldozed off in preparation for construction. For 50 yards along the road and 10 yards southwest of it a small assemblage of chipped-stone artifacts was made: 23 points and blades and 146 chips. No potsherds were seen. In view of the prominence of chert and percentage distribution of the chipped-stone artifacts, the site is assigned to a preceramic "chert-using" horizon.

RB–7, Battle or Bell Mound No. 1 and *Chief's or Bell Mound No. 2*, have been described as follows (Valentine Museum, 1898, p. 58):

> Battle or Bell Mound No. 1. Located on the farm of John M. Bell, on Calf Pasture River, about 4 miles from Goshen, Rockbridge County, Virginia. Explored in 1877 by Mann S. and Granville G. Valentine for the Valentine Collections. Contained about 50 skeletons buried in parallel chambers, 2 tiers deep, walled with boulders and covered with slabs of slate. A spear head, a few small shell beads and fragments of burnt-clay pottery accompanied the human remains.
> Chief's or Bell Mound No. 2. Located on the farm of John M. Bell, on the Calf Pasture River, distant 150 yards from the Battle Mound and about 4 miles from Goshen, Rockbridge County, Virginia. Explored in 1877 by Mann S. and Granville G. Valentine for the Valentine Collections. Contained burnt human bones, with which had been buried hematite paint, sheet mica 11 inches across the face, a polished hatchet, 2 pierced tablets of fine grain slate, a clear quartz crystal weighing about an ounce, and a flat piece of copper about 3/16 of an inch thick by 2½ inches long.

These mounds were difficult to relocate. Search and inquiry along Calfpasture River did not reveal any mound or anyone who had ever heard of them. There was no property known to have been owned by a Mr. Bell in the late 1800's. An informant in Goshen directed me to a Bell farm on Little Calfpasture River where it was known two mounds had been located. This area is a roughly oval plateau extending from the Knob 1.2 miles to the west and is 2.2 miles southeast of Goshen. The plateau extends to Little Calfpasture River and is 0.25 mile north of what is probably the Calfpasture River. Maps of the area list an upper part of the river as Calfpasture and a lower part as North River. It is difficult to decide where one begins and the other ends.

On the northern part of the plateau the remains of a mound, 6 inches high, 20 feet in diameter, and surrounded by a narrow, shallow ditch, were recognizable. The soil was not charcoal stained but sandy, tan, and hard packed. A few chips were recovered from the surface. One hundred and fifty yards to the west were the probable remains of a second mound.

At the Valentine Museum, in a showcase displaying objects from the Battle Mound, there are 12 Radford Series sherds labeled "Rockbridge County, Virginia," beads, a quartzite Large Triangular Blade Type T, and a polished greenstone celt. Through the courtesy of Mrs. Virginia Claiborne, director of the Museum, I was allowed to search the storage drawers for other sherds. In one, with many human bones, were 220 sherds labeled "Rockbridge County, Virginia." The sherds had the identical labeling as those in the showcase, and the character of the ceramic material of both was identical. It is believed that this material constitutes the "burnt-clay pottery" from the Battle or Bell Mound No. 1.

The pottery is thick, gray to gray-tan in color, has large angular holes from leached limestone temper and in some sherds large chunks of limestone are still present.

PROJECTILE POINTS AND LARGE BLADES

The groundwork of projectile point and large blade classification in Virginia had been made as a companion study to Evans' (1955) ceramic study where it appears as an appendix (Holland, 1955). After much classification and reclassification, these stone artifacts, assembled from many parts of the State, were sorted into 23 types. The classification was largely worked out on modification of basal portions although the blade was by no means neglected. After a satisfactory classification had been established the material was typed by site, the percentage occurrence of each type determined, and the resulting percentages fashioned into bar graphs. It was possible to bring sites from distant parts of Virginia into a single seriation, an aspect of the study which had not been possible with ceramic material.

When the ceramic and chipped-stone seriations, which had been independently developed by Evans and Holland, respectively, were compared, it was found that they mutually supported one another as relative time markers (cf. op. cit. pp. 140–141; figs. 17, 18, 19, 23). This was particularly marked in the Central and North Central Ceramic Area from which a relatively large number of sites with both ceramic and chipped-stone collections were represented. This conformity immediately suggested the possibility that, in a limited area, the chipped-stone material might be as sensitive to changes through time as ceramics. However, the fact that a larger area could be brought into a single seriated sequence argued against this impression. A test case was needed; the limited area of this survey would offer proof of this concept.

A thumbnail description and outline drawings (figs. 2 and 3) of the 23 types of projectile points and large blades of Virginia follow to help the reader understand the interpretations and conclusions of this report, but the reader is referred to Holland's (1955, pp. 165–181) original study for full details.

Small Triangular Type A (fig. 2; Holland, 1955, pl. 24, *a*) is from 1.0 to 2.0 cm. long and 1.0 to 1.6 cm. wide at the base. The outlines are either isosceles or equilateral. Some specimens have excurvate sides but the bases are predominantly straight.

Medium Triangular Type B (fig. 2; Holland, 1955, pl. 24, *b*) is 1.5 to 2.3 cm. long and 1.5 to 2.0 cm. across the base. Both isosceles and equilateral forms predominate.

Triangular Type C (fig. 2; Holland, 1955, pl. 25, *a*) is from 2.5 to 4.0 cm. long and the majority are between 2.0 and 3.5 cm. wide. The blade is generally

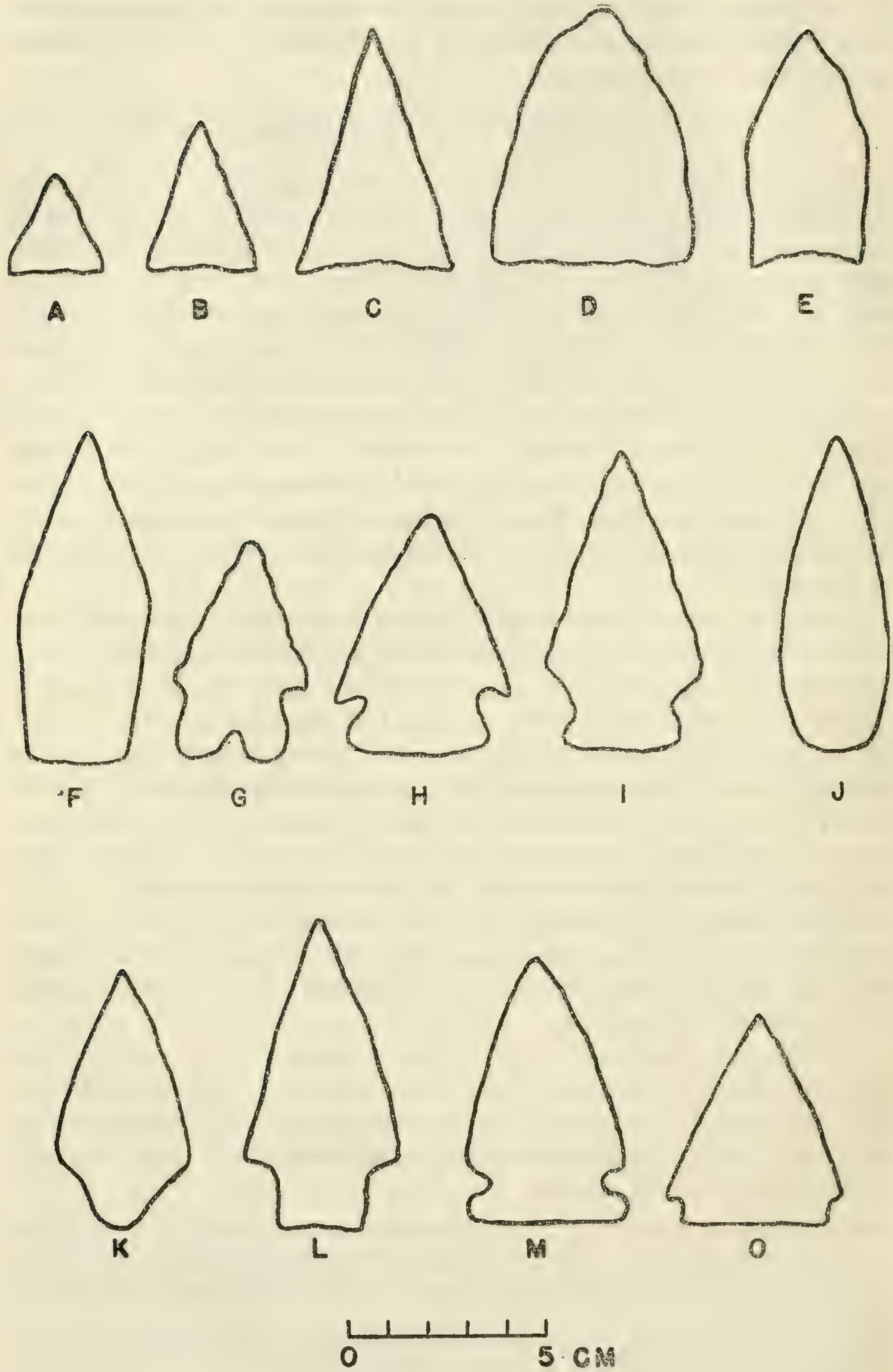

A
B
C
D
E
F
G
H
I
J
K
L
M
O
0
5 CM

FIGURE 2.—Projectile-point types.

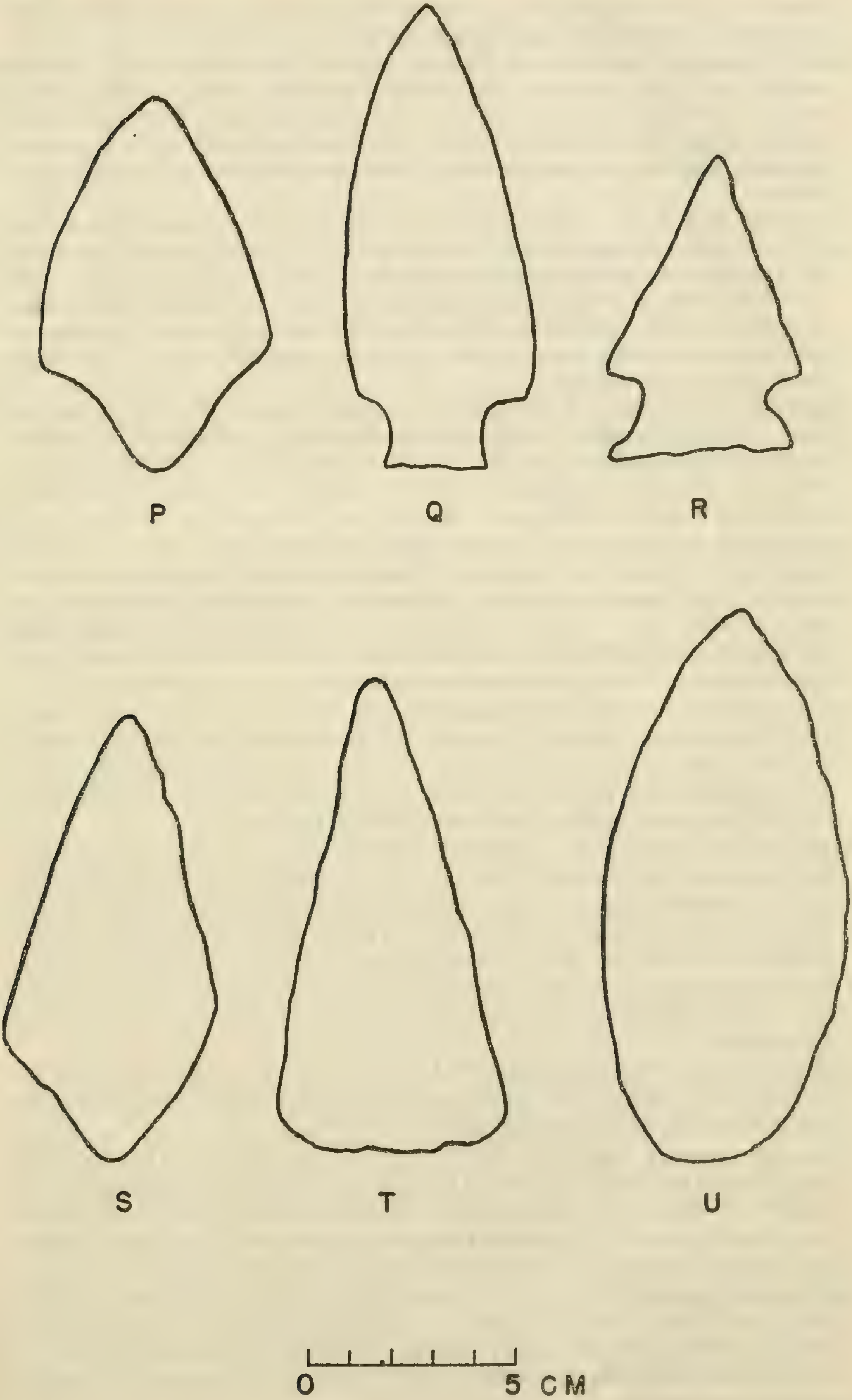

P
Q
R
S
T
U
0
5 CM

FIGURE 3.—Large blade types.

isosceles. There is more of an incurvate basal trend in this type than in the other two. All three triangular types are thin, 5 mm. or less.

Crude Triangular Type D (fig. 2; Holland, 1955, pl. 25, *b*) is 2.5 to 7.0 cm. long and 2.0 to 4.5 cm. in width, representing a motley group of crude artifacts having a generally triangular shape. They are consistently thick (to 15 mm.) and the edges are irregularly flaked. This group of artifacts is thought to represent abortive attempts to fashion triangular projectile points of types A, B, and C.

Pentagonal Type E (fig. 2; Holland, 1955, pl. 26, *a*) varies between 2.5 to 4.0 cm. in length and between 2.0 and 3.5 cm. in width. From the base toward the point the sides are parallel to one another ⅓ to ⅔ the length of the blade. The sides then form an obtuse angle and come together at the apex. This produces an artifact with 2 right angles at the base, 2 obtuse angles along the sides, and an acute angle at the apex. These angles are usually rounded. The blades are thin, less than 0.5 cm.

Lanceolate Type F (fig. 2; Holland, 1955, pl. 26, *b*) is from 2.7 to 8.0 cm. long and from 1.7 to 2.5 cm. wide. Beginning at the base the 2 sides parallel one another for ⅓ to ⅔ the length of the blade and then converge gracefully to the apex. There is no definite angulation along the edges of the blade. The blade is usually 0.5 to 1.0 cm. thick.

Notched Base Type G (fig. 2; Holland, 1955, pl. 27, *a*) is from 2.5 to 4.0 cm. in length and 2.0 to 2.5 cm. in width. The blade is usually separated from the base by small lateral projections or shoulders. The blade is triangular and frequently serrated. The base is indented by a narrow 2- to 4-mm.-deep notch. The lateral angles of the base are rounded and confluent with the curve of the central notch. The edges of the base are parallel below the blade.

Stubby Barbed Type H (fig. 2; Holland, 1955, pl. 27, *b*) is 2.0 to 4.0 cm. in length and 1.5 to 3.0 cm. in width. The blade is trianguloid with distinctly pointed shoulders which give a barbed effect. The blade is approximately as wide as it is long and since the overall length is relatively short the artifacts have a "stubby" appearance, hence the name "Stubby Barbed."

Notched Stemmed Type I (fig. 2; Holland, 1955, pl. 28, *a*) is 2.0 to 6.0 cm. in length and 2.0 to 3.0 cm. in width. The blade of the majority is long in comparison to the relatively narrow width. They are oval or diamond shaped in cross section and medium thick (4–7 mm.). The shoulders are rounded and are always wider than the base. The stem is produced by narrowing the blade with two shallow elongated notches. The stem and blade are not sharply demarcated one from the other. The base and notches are sometimes "smoothed."

Ovoid Base Type J (fig. 2; Holland, 1955, pl. 28, *b*) is 3.0 to 5.5 cm. in length and 1.3 to 3.0 cm. in width. The blade has a long isosceles form, is without shoulders and gradually fades into the rounded or oval base.

Contracting Stemmed Type K (fig. 2; Holland, 1955, pl. 29, *a*) is 3.0 to 6.0 cm. long and 1.4 to 3.0 cm. wide. The blade is long isosceles in form and diamond or oval shaped in cross section. Shoulders are rudimentary or definite and if definite are generally small. The base is triangular in shape with the base of the triangle toward the blade. The stem may be ¼ to ½ of the entire artifact.

Parallel-sided Stemmed Type L (fig. 2; Holland, 1955, pl. 29, *b*) is 3.5 to 6.5 cm. long and 1.5 to 3.5 cm. wide. The blade is triangular with definite shoulders which may be rounded but are usually angular. The stem is characteristically 1.0 to 1.5 cm. long and symmetrically placed between the shoulders. The sides of the stem are parallel.

Side-notched Type M (fig. 2; Holland, 1955, pl. 30, *a*) is 3.2 to 5.0 cm. long and 1.6 to 3.3 cm. wide. The blade is triangular with either straight or excurvate sides. The shoulders are formed by notches on either side of the blade which interrupt the extension of the blade to the base. The base is always as wide as, if not wider than, the shoulders.

Unclassified Type N are fragments of projectile points from Type A to Type O which cannot be identified for more specific categorization. Also those projectile points that do not fit any type description are placed here.

Eared or Corner-notched Type O (fig. 2; Holland, 1955, pl. 30, *b*) is 3.0 to 4.0 cm. long and 2.0 to 3.0 cm. wide. The stem is very short and lacks 4 to 6 mm. of being as wide as the blade. The stem is also generally 3 to 6 mm. long and with straight sides. Occasionally there is a short tang.

Large Contracting Stemmed Type P (fig. 3) is 6.0 to 8.0 cm. long and 3.5 to 5.0 cm. wide. The blade is usually excurvate, 7 to 10 mm. thick. One shoulder is usually angular and the other rounded. These shoulders are usually 10 mm. wide regardless of shape. The stem is centrally placed at the base of the blade and contracts to a rounded angle. Occasionally the rounded angle is replaced by a straight or oblique section. Except for larger proportions this type is similar to Type K.

Large Parallel-sided Stemmed Type Q (fig. 3) is from 6.0 to 14.0 cm. long and 2.8 to 4.5 cm. wide. The blade is trianguloid with straight edges. The stem is centrally placed and joins the blade with angles of rounded contour. The sides of the stem are straight and parallel. Except for larger proportions this type is similar to Type L.

Large Side-notched Type R (fig. 3) is 6.0 to 7.0 cm. long and 2.5 to 4.0 cm. wide. The blade has straight or gracefully excurvate sides. The shoulders are symmetrical and the stem is usually produced by shallow elongated notches. When the notches are angular and oblique they produce an expanding stem with rounded tangs.

Large Pointed Base Type S (fig. 3) is 7.0 to 10.0 cm. long and from 3.5 to 4.2 cm. wide. The blades are consistently excurvate with the maximum width near the center of the blade. The stem tapers to the base, forming rudimentary shoulders which may be present on one side and not the other. This type, except for larger size, is similar to Type K.

Large Triangular Blade Type T (fig. 3) is from 6.0 to 8.5 cm. long and 2.0 and 4.5 cm. wide. The shape is isosceles and the base is straight. Except for large size it is similar to triangular Types A, B, and C.

Large Rounded Base Type U (fig. 3) is 6.3 to 11.0 cm. long and the width ranges from 2.6 to 5.5 cm. The blade is generally triangular or oval and the base is rounded or oval. It is similar to Type J except for larger size. In the survey area more latitude was allowed in this type than the narrow limits set by this description. Some blades were rounded on both ends and occasionally a blade would be rounded on one end and straight on the other.

Large unclassified blades Type V represent fragments of large blades which are so incomplete they cannot be identified as belonging to any other category.

After classification the points and blades were seriated according to accepted procedure (for details, see Evans, 1955, pp. 76–80), completely independent of the pottery. The number of artifacts in each type for each site was calculated, the totals determined, and the percentage breakdown for the individual types worked out on slide rule. These figures are listed as horizontal columns in table 6 of the Appendix with the projectile points lettered A through O and large blades lettered from P through V. The breakdown into types of rock material is found in vertical columns with totals and percentages at the bottom of each column. The percentage occurrences of projectile-point and large blade types from each site were fashioned into bar graphs on millimeter graph paper with 1 cm. of graph equal to 10 percent, for the experimental seriations.

It was necessary to form two seriation charts. From my previous experience with Virginia artifacts, as well as comparison with the results of others using the same techniques (Ford, 1949, pp. 35–37), a minimum of 50 artifacts is considered the smallest sample which will give reasonably accurate results. The primary seriation, figure 4, is based entirely on 50 or more artifacts per sample and percentages are shown, for easy reference, as solid bars. In the second seriation, figure 5, the relative position of sites with large samples (solid bars) has been maintained, and sites with small samples (20 to 48 artifacts) have been inserted as diagonally hatched bars.

In the text it has been found expedient to divide the exposition into three groups of sites. The first group to be described, and at the top of both seriation charts, belongs to the ceramic horizon. The second and third groups belong to two separate, well-defined preceramic horizons.

Seriation of projectile points and large blades was accomplished in the ceramic horizon first. (Although the stone-artifact collection from site RM–4 was large, this site had to be left out of the seriations because of a mixture of the artifacts with site RM–4A.) There are two reasons for this. It is conceded that ceramic sites are generally later in time than nonceramic sites, therefore the top or most recent period of the chart was established. This temporal hypothesis was not proved by stratigraphy in the survey area, and whether it is of value can only be determined by the results of the seriation. Secondly, from previous studies definite trends of the points and blades of the ceramic horizon of Virginia are known and could be anticipated to appear in this region.

The trends in the previous study (Holland, 1955, fig. 23) were developed by Small Triangular Type A, Medium Triangular Type B, Triangular Type C, Notched Stemmed Type I, Parallel-sided Stemmed Type L, and Large Parallel-sided Stemmed Type Q. Beginning in the preceramic horizon, the triangular forms have a low level of occurrence while Notched Stemmed Type I blossomed and faded. Parallel-sided Stemmed Type L blossomed during the early ceramic period and then faded, a trend followed by its large counterpart Type Q. When Type L had faded to 1 percent and 5 percent, Triangular Type C reached a peak of 30 percent to 56 percent. Type C decreases at

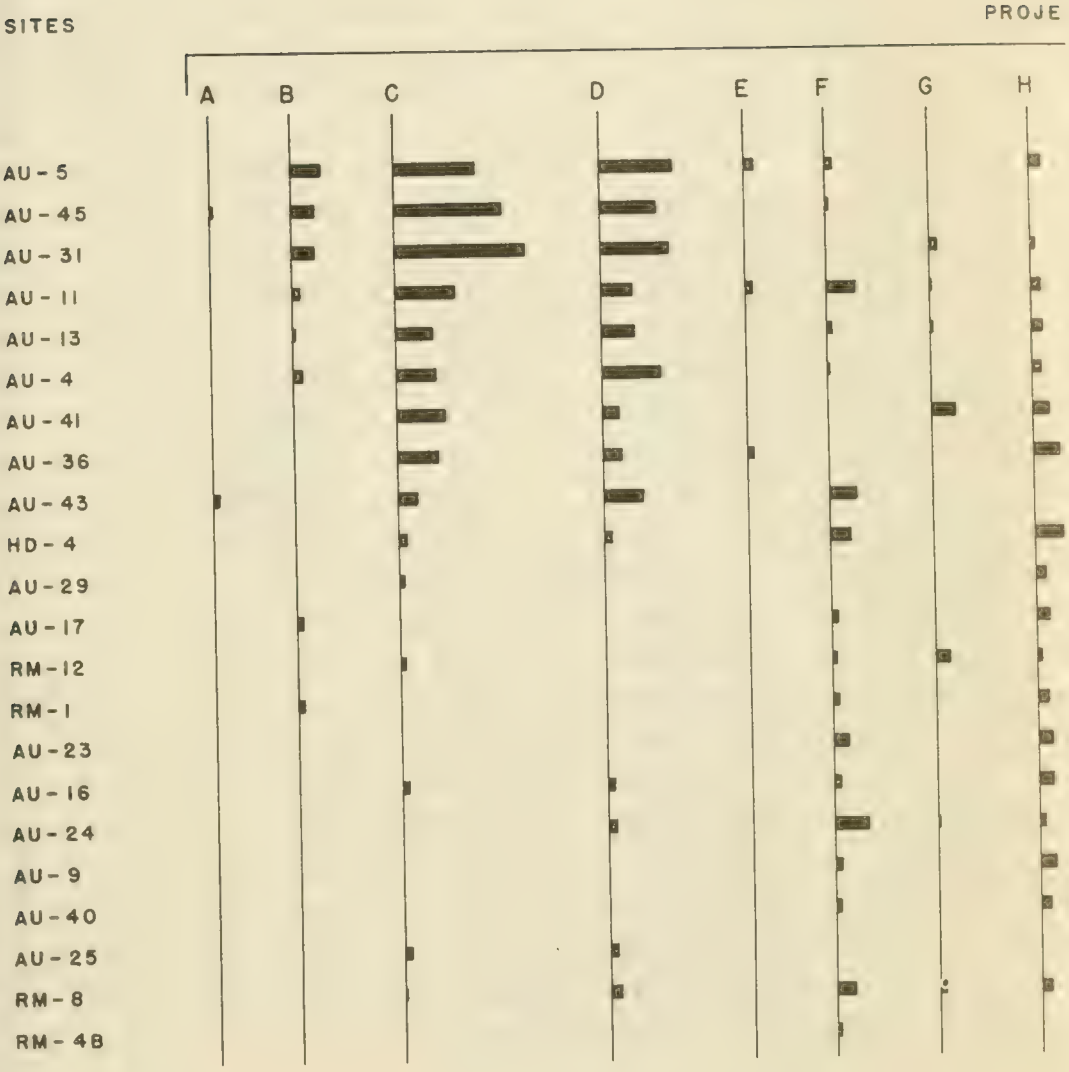


FIGURE 4—

471762 O -60 (Face p. 48)

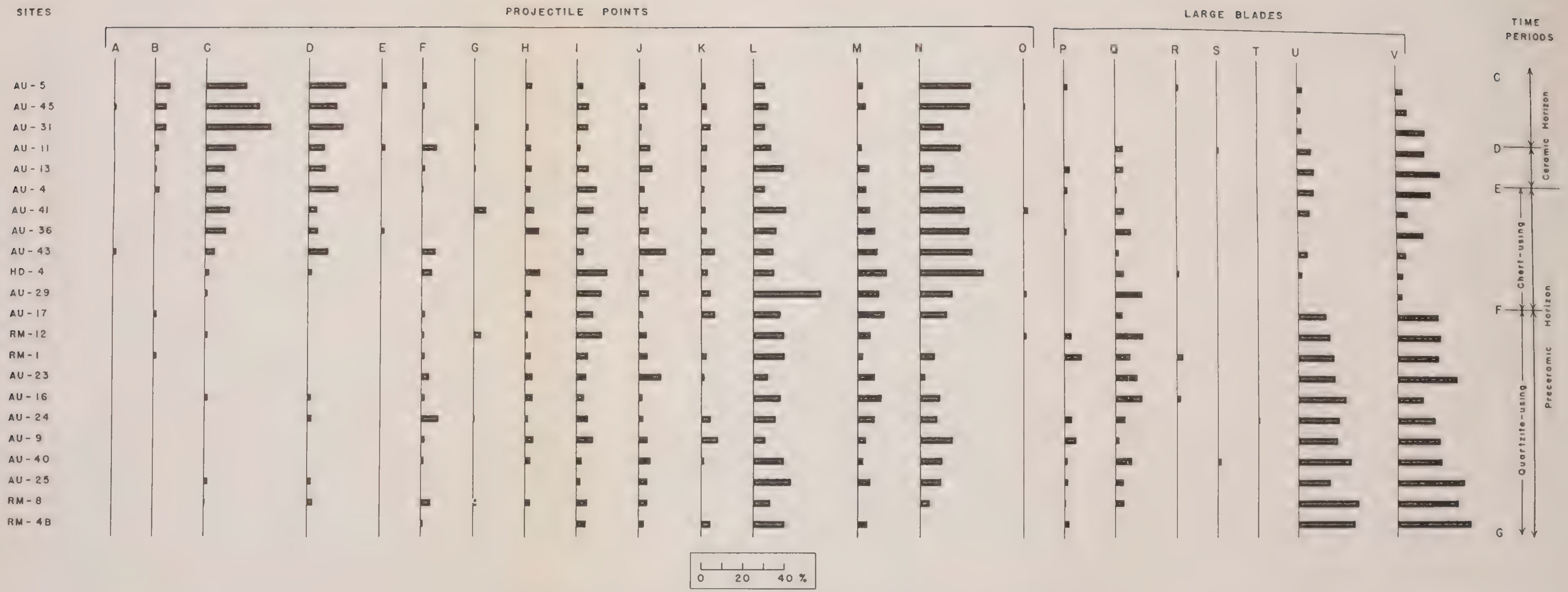


Figure 4—Primary seriation of projectile points and large blades from sites with 50 or more artifacts.

471762 O -60 (Face p. 48)

the top of the ceramic period to 10 percent or less and Types B and A are then the most popular types.

With these trends as a guide, five ceramic-bearing sites (AU–13, AU–11, AU–45, AU–31, and AU–5) with large collections of points and blades were seriated with increasing percentages of Triangular Types B and C and decreasing percentages of Type L. It was gratifying to note a steady progressive increase in Type B from 0.6 percent to 7.1 percent and a similar though more irregular increase in Type C from 8.7 percent to 19.5 percent while the popularity of Type L declined progressively from 14.3 percent to 5.3 percent. Type I did not show any trends. These trends, when compared with the trends developed for Virginia as a whole (Holland, 1955, fig. 23), reveal that we are dealing with the earliest section of the total ceramic horizon. The later periods, represented by fading of Type C and blossoming of Types A and B, had not been reached by these particular sites.

In the other categories a steady increase is noted in Type D from 8.1 percent to 17.6 percent, a point to be expected if the seriation is correct, for this type represents trianguloid rejects related to the manufacture of Triangular Points, Types A, B, and C. A decreasing trend is noted in Type J from 6.2 percent to 2.7 percent, in Type U from 8.7 percent to 2.7 percent, and Type V from 22.5 percent to 3.5 percent. Trends in the other categories are not readily apparent in a study of this ceramic horizon alone.

If the hypothesis that nonceramic sites are older than ceramic sites is correct, the trends established during this early ceramic horizon are expected to be continuations of similar trends from the nonceramic horizon. Therefore, bar graphs of nonceramic sites were arranged to continue downward and backward in time and to develop the best increasing and declining popularity of types in the ceramic horizon. The first six nonceramic sites (AU–4, AU–41, AU–36, AU–43, HD–4, and AU–29) to continue the trends (figs. 4 and 5) constitute a unit and will be described first.

Type B, with a 2.1 percent occurrence, is present in the uppermost nonceramic site only (fig. 4, site AU–4). Types C and D decrease steadily down the sequence from 9.5 percent and 14.3 percent to 1.2 percent and 0 percent, respectively. Type L maintains the greatest popularity found in the lowest ceramic sites, though somewhat irregularly, at about a 12 percent level of occurrence. An excellent trend has developed in Type M which steadily increases down the chart from 4.1 percent to 10.2 percent. This is paralleled, though irregularly, by Type Q with an increase from 0.7 percent to 13.0 percent. Both trends, begun in the early ceramic horizon, bridge the two horizons. Type I, which shows an irregular occurrence in the ceramic sequence, increases somewhat abruptly in the nonceramic sequence and appears to be forming an increasing trend as older sites are added to the chart. There is a small but noticeable increase in occurrence of Type K in the lower part of this nonceramic site sequence. Type J continues the same percentage level of the lowermost ceramic sites. Types V and U, instead of increasing, reverse their trends and decline through the sequence. Trends in the other categories are not distinctive.

These six nonceramic sites, selected, as has been said above, solely on the basis of continuing the popularity trends of points and blades of ceramic horizon sites, were later found to have characteristics which set them aside as a definite horizon. After the analysis of rock material (p. 65) had been completed, it was discovered that in these sites 60 percent or more of the rock material used to manufacture the projectile points and large blades had been chert. Therefore the term "chert-using" has been applied to the complex. The full meaning of this is discussed in detail in the section on relationship of sequences (see pp. 80–88).

Again a set of sites (AU–17, RM–12, AU–23, AU–24, AU–9, AU–40, RM–1, AU–25, RM–8, and RM–4B) (fig. 4) were selected and arranged to continue the best trends established by the upper 11 sites. It was immediately evident that trends in the trianguloid series of points, Types A, B, C, and D, had long ago terminated and the presence of any of these types now appeared to be sporadic. Type D occurring at site AU–16, AU–24, AU–25, and RM–8 in 1.8 percent, 2.0 percent, 2.0 percent, and 2.7 percent, respectively, is too low a percentage occurrence to be of any significance and it must be remembered that this type is an unclassified trianguloid anyway, a classification always open to discussion. The presence of Type B at RM–1 can possibly be the occurrence of materials related to the adjoining site, RM–1A, where a higher percentage of chert materials and a few sherds place this site in the ceramic horizon. Under these circumstances this low percentage occurrence of Type B points, one point at both sites AU–17 and RM–1 in a position in the sequence which appears out of order, should not be considered as a violation of the basic trends or meaning of the seriated sequence.

Types I, M, and Q, which had blossomed at the bottom of the first six nonceramic site sequences, maintain their popularity in the upper part of this 11-site sequence, but gradually fade at the bottom to 4.5 percent, 4.5 percent, and 0 percent respectively. Type L maintains its maximum popularity and Types F, H, and J, while showing no increasing or decreasing trends, are present on all sites in low percentages. The most striking changes are shown in the large blade categories, Types U and V. These suddenly blossom and, throughout the 11-site sequence, hold a steady popularity unequaled in the sites above.

These lowest 11 sites, like the upper 6 nonceramic sites, have, on consideration of the type of rock material, another characteristic which establishes them as a separate preceramic complex. The details of this study follow in the section on relationship of sequences (see pp. 80–81), but it is pertinent to mention that for these sites quartzite was the most popular rock material used to manufacture the points and blades. No less than 74.6 percent of each site are made of this material; for this reason the complex has been named "quartzite-using."

Since we have viewed the seriation in three separate units, it will be well to view it as a whole to see if the three horizons have continuous trends (figs. 4 and 5). This appears to be true. Medium Triangular Type B appears in the "chert-using" horizon and increases steadily through time on into the ceramic horizon. Triangular Type C and Crude Triangular Type D begin at an earlier time level and steadily increase in popularity to the top of the chart. This parallelism between Type D and the other triangular types is so striking that it adds weight to the probability that Crude Triangular Type D is essentially nothing more than an abortive effort, a reject, in the manufacture of triangular-type points. Pentagonal Type E, Notched Base Type G, Large Side-notched Type R, Large Pointed Base Type S and Large Triangular Blade Type T occur sporadically and in small percentages throughout the sequence. Viewed from bottom to top, Lanceolate Type F has a small but steadier occurrence in the "quartzite-using" horizon, being less important in the ceramic horizon at the top of the sequence. Notched Stemmed Type I, Side-notched Type M, Parallel-sided Stemmed Type L, and Large Parallel-sided Stemmed Type Q have their maximum occurrence in the preceramic horizons at a point where the "quartzite-using" and "chert-using" complexes overlap.

As will be recalled Type N includes unclassified projectile-point fragments of Types A through O. A similar unclassified category, Type V, had been established for the blades. It was felt that these groupings were essential to the true understanding of the differences between frequency of blades and smaller projectile points, for so many fragments were large enough to group into one of these categories but too small to subdivide into one of the types based on total shape. Examination of the seriation, figures 4 and 5, shows that Type N is most abundant throughout the ceramic and the "chert-using" complexes (i. e., the upper part of the sequence) whereas Type V is most common in the "quartzite-using" complex. These two unclassified categories indicate how clearly the shift occurs from a predominance of large blades in the lower part of the sequence to a greater popularity of smaller chipped tools in the upper or later part of the sequence.

Using the trends established by sites with a large sample, it was also possible to place all sites but one with small collections of 20 to 48 artifacts in the seriation and maintain the trends already established (fig. 5). The single exception, AU–30, at Natural Chimneys samples had not been collected by the writer but was material exhibited from tunnels and caves in the base of the Chimneys. Not only are the trends of the various types in the sequence maintained by using these sites with smaller collections, but the homogeneity of the characteristics of the various culture horizons are preserved. The inclusion of these sites expands the scope of the sequence, smooths out some of the trends of the various point and blade types, and also permits assessment of the position of more sites in the survey area from both the ceramic and preceramic horizons.

The justification for the use of these sites with small samples, sometimes causing the percentages to be slightly overloaded, can be demonstrated by picking out a few sites and showing how they can only fit into one particular part of the sequence even though some of the individual bars on the graph appear slightly askew.

The placing of site AU–35–V–1 near the upper part of the point and blade sequence (fig. 5) is justified for several reasons. Types B and C are more popular in the upper part of the chart. The limited percentage of any blades from this site definitely rules it out of the lower part of the seriation. Thus, even though the percentage of Type C, with 50 percent, appears highly exaggerated owing to the small sample, this overextended percentage bar does not interfere with the general position of the site or the trends which site AU–35–V–1 helps fill out for Types B, D, and M.

Similar situations are demonstrable with such sites as RM–6 with 39, RM–3 with 31, AU–38 with 45, and RB–6 with 23 specimens. Each fits roughly into the sequence according to noticeable absences of significant point and blade types and takes a specific position as a result of a continuation of the trends established by the sites with the larger samples.

To summarize briefly the results of the seriation of the points and blades from the sites without recourse to the analysis of the pottery or rock materials, the same general trends established for the entire State of Virginia (Holland, 1955, fig. 23) repeat themselves in the limited area of the survey. This seriated sequence of northwestern Virginia, however, smooths out some of the rough spots in the original study and tends to give a more gradual curve to each of the types as a result of having available more sites closely related in time from a limited

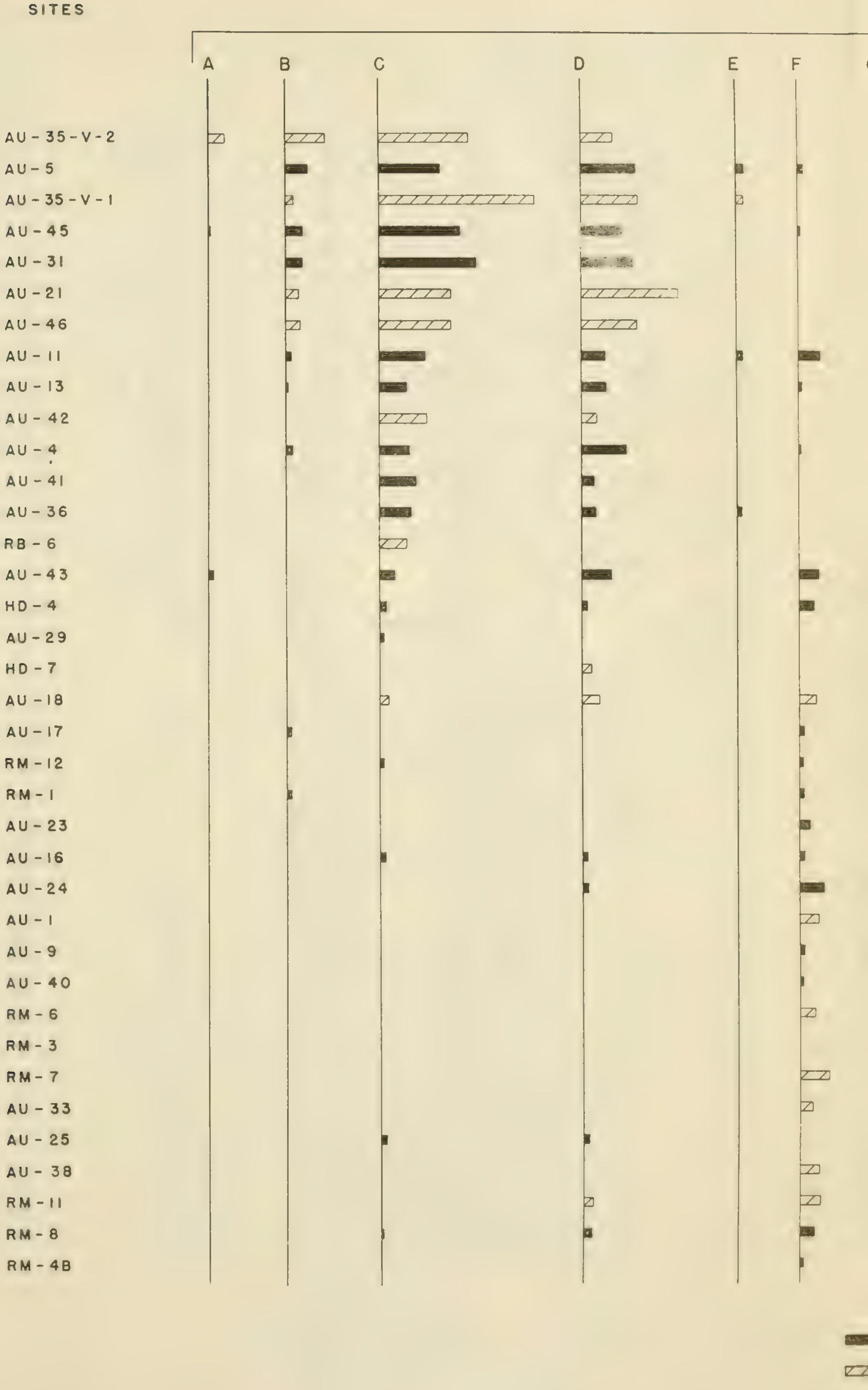


FIGURE 5.—Secondary seriation c

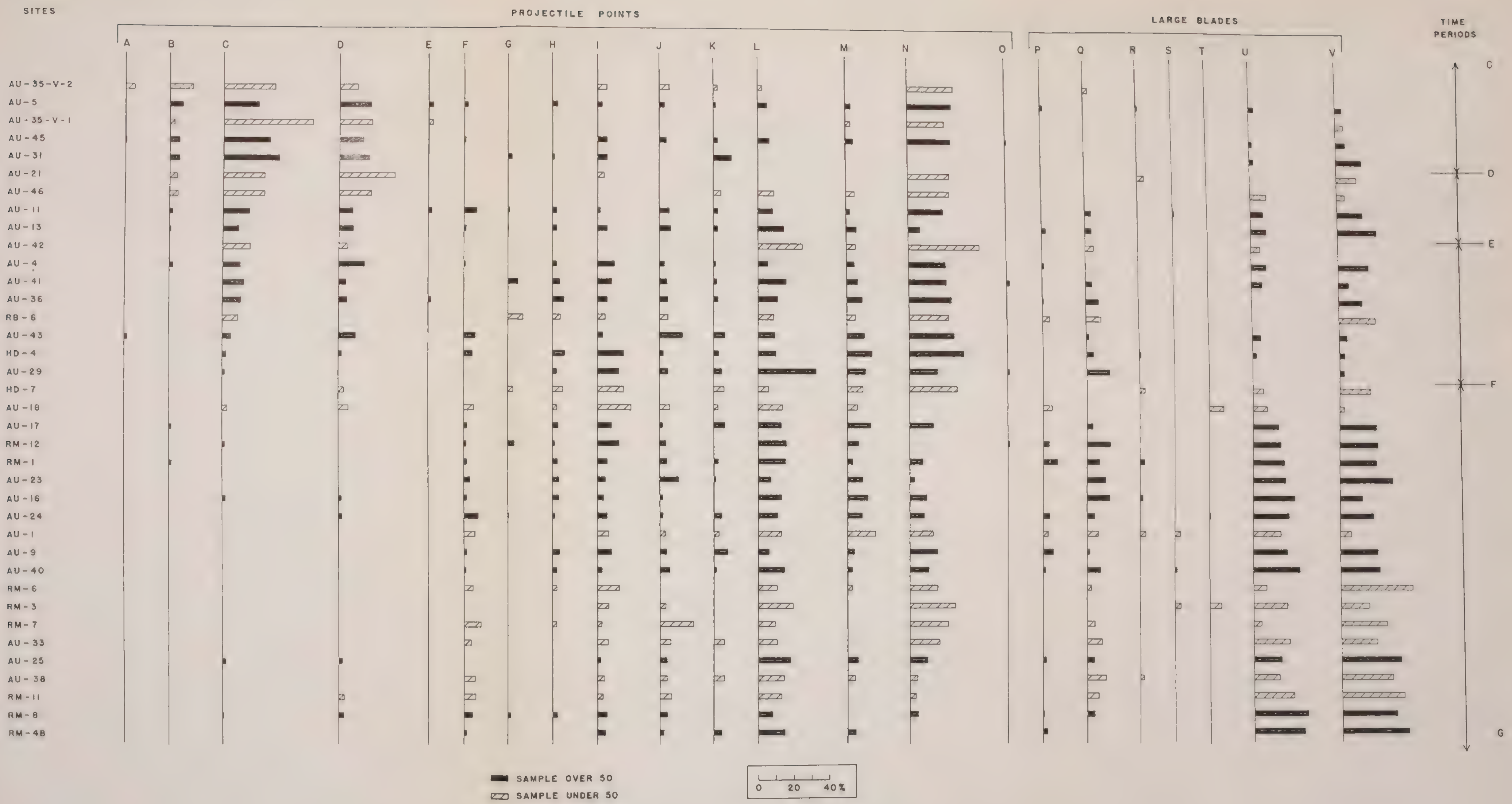


FIGURE 5.—Secondary seriation of projectile points and large blades from sites with 20 to 48 artifacts interdigitated into the primary sequence of figure 4.

471762 O - 60 (Face p. 52)

geographical area. The strong emphasis on large blade types in the "quartzite-using" complex of the preceramic horizon, the lowest part of the sequence, with the absence of trianguloid forms is of definite importance in helping to define the cultural complex of this period and proves an important time marker in the sequence. Throughout time the popularity of blades declines in favor of the smaller projectile points of various shapes, each with minor fluctuations of its own. In the later part of the sequence, the increased popularity of triangular points, Types B and C, with their related category of probable rejects, Type D, is a point which is of some significance and can be further expanded after those sites with pottery have been seriated independently of this sequence. In short, it appears as if another demonstration has been made in Virginia (cf. Holland, 1955, pp. 174–175) that chipped-stone objects are sensitive to cultural change through time, and the seriation of these changes into a sequence can be useful in establishing a type of time scale where no other artifacts or techniques are available.

MISCELLANEOUS ARTIFACTS

Artifacts other than pottery, projectile points, and large blades and chips were found in small quantities and with irregular occurrence from site to site. The exact numbers and classification are listed in horizontal columns for each site in table 6 of the Appendix. The type of rock material of which they are made is given in vertical columns. Since there are so few no attempt has been made to reduce them to percentage occurrences by site. The various categories of artifacts are listed below:

Crude axes (fig. 6, *a*). These were generally cobbles of greenstone that had been shaped by percussion and notched on either edge. The scars of flaking were still present and only occasionally a pecked channel connected the notched edges. The notches were placed to one side of the center of the length. The bit was not modified by grinding. Occasionally a cobble was only notched on either edge and otherwise unmodified. They were generally 8 cm. wide, 10 to 16 cm. long, and 2 to 3 cm. thick.

Crude celts (fig. 6, *b*). Cobbles of greenstone had been flaked in such a fashion as to form a flat rectanguloid artifact 13 to 16 cm. long, 6 cm. wide across the bit, and 1.5 to 3.0 cm. thick. Scars of percussion flaking made the faces irregular. The bit expanded slightly and the poll was narrowed and either straight or oval. There was no evidence of grinding to smooth either the edges or faces.

Pecked or polished celts (fig. 6, *c*). These were modified cobbles of greenstone that had been fashioned into a sharp cutting implement. The bit was straight and sharp and usually wider than the rest of the artifact. The poll was oval or pointed. The faces had been worked smooth and either exhibited the small pits of pecking or were slick from polishing. The majority were 11 to 13 cm. long, 4 to 6 cm. wide, and 2 to 3 cm. thick.

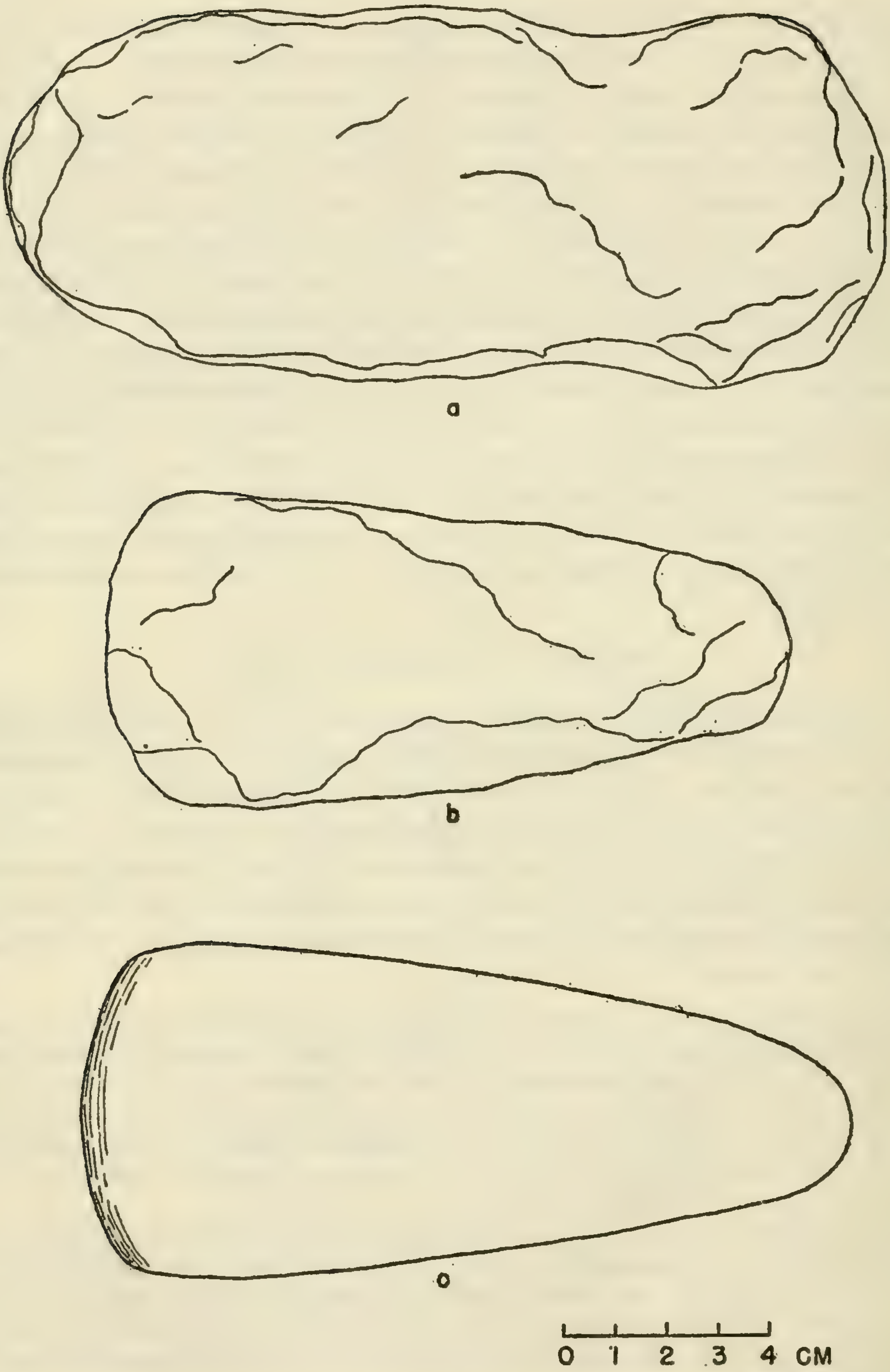

a
b
c
0 1 2 3 4 CM

Figure 6.—Artifact types: *a*, Crude ax; *b*, crude celt; *c*, polished celt.

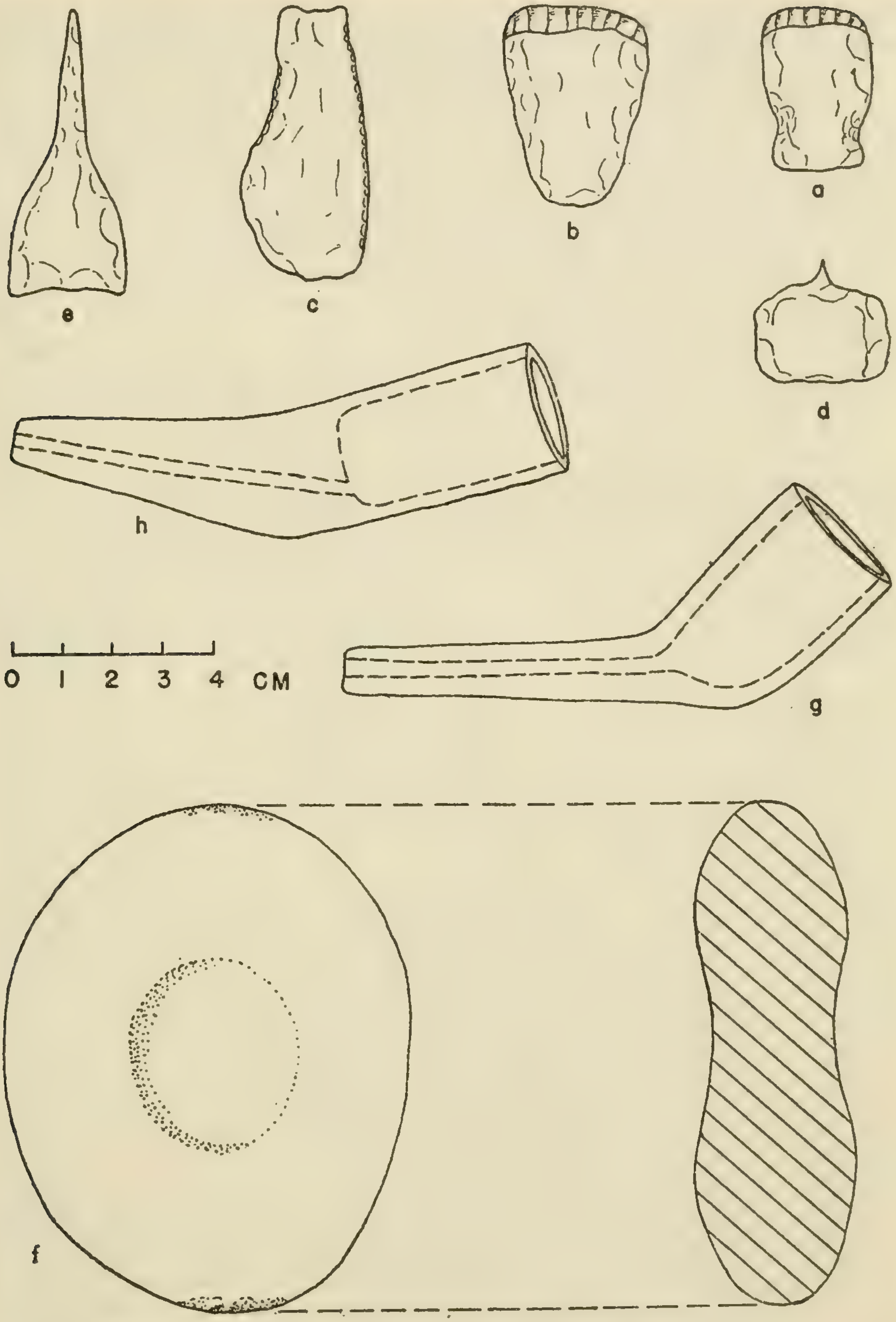


Figure 7.—Artifact types: *a*, Hafted scraper; *b*, end scraper; *c*, side scraper; *d*, graver; *e*, drill; *f*, hammer-anvil stone; *g*, chlorite pipe; *h*, clay pipe.

End scrapers, modified for hafting (fig. 7, *a*). These objects have rectangular blades and one straight or oval end and the other end has either been side notched or stemmed. They appear frequently to have been broken projectile points that have been reworked on the fractured end.

End scrapers (or snubnosed scrapers) (fig. 7, *b*). These are oval or rectanguloid fragments 3.0 to 3.5 cm. wide, 3.0 to 4.0 cm. long, and 1.0 cm. thick. One side of these artifacts has been modified by secondary flaking to produce a sloping edge. The longer edge is usually sharply angular while the other is rounded. This modified edge may be ¼ to ½ the perimeter of the artifact.

Side scrapers (fig. 7, *c*). These are medium-sized elongated chips that have been modified by secondary flaking on one or both lengthwise edges. There were only three of these found in the entire survey.

Graver (fig. 7, *d*). These are small, flat, rectanguloid chipped-stone artifacts that have had one edge modified to form a short, sharp, triangular point. Only 4 were found.

Drills (fig. 7, *e*). This class was defined on the basis of an elongated narrow blade, usually diamond shaped or oval in cross section, with an expanding base, or, as occasionally seen, no modified base but a continuation of the narrow blade from one end to the other. The blade varied between 0.5 and 1.0 cm. wide and the overall length was 4.0 to 5.0 cm. The expanding base was roughly rectangular or triangular in outline. T- or Y-shaped specimens were not encountered.

Mano. Only one specimen, found on a preceramic "quartzite-using" station that had been resettled during the ceramic horizon (RM–4A). This roughly oval specimen had a flat surface for grinding and the opposite side was rounded, measuring 10 cm. long, 8 cm. wide, and 4 cm. thick.

Hammer-anvil stones (fig. 7, *f*). These were oval quartzite river cobbles, usually 10 cm. long, 8 cm. wide, and 4 cm. thick, that had been battered along one edge and were pitted on one or both faces. The pits varied from shallow, circular pecked areas in the center of a face to 1.5 cm. deep. The pits indicate that they may have been used also as anvil stones.

Pipes, chlorite (fig. 7, *g*). A number of pipes were observed during the survey in local collections and at the Valentine Museum. Those in local collections were not accompanied by provenience or else the data was so meager (AU–19) that the pipe could not be assigned to a horizon. At AU–11 a large fragment was from an obtuse angle pipe with a round bowl and flat stem. Fragments were discovered at two sites (AU–31 and AU–18) but reconstruction of the entire artifact was not possible. Pipes found in mounds (AU–35–M, and literature) either lack data of provenience or occur during the Late or Middle Woodland periods which are not well represented by the survey.

Pipes, clay (fig. 7, *h*). The only complete specimen seen during the survey was from the Hayes' Creek Mound (RB–2). This was an obtuse angle pipe in imitation of a similar chlorite specimen from the same mound and also similar to the chlorite pipe found in the excavation of AU–35–M. One fragment from AU–13 is a right-angle type made for insertion of a stem. The other fragment from the same site in the collection of Jerry Brownlee had a tapered stem. The fragments from HD–2 were so incomplete they could not be reconstructed.

Soapstone vessels. This category refers to fragments of soapstone vessels that have been broken. No complete vessel was found.

Quartz crystal. Both Fowke (1894) and the Valentine Museum (1903) mention the occurrence of quartz crystals during their excavations. The ones collected during the survey were small. None had been modified.

Pendants. Only one complete pendant was discovered with a burial at AU-35-M. The others were fragmentary and reconstruction was not possible. In general they appeared to be elongated, drilled from both faces to the center.

Table 3 was organized to bring these artifacts into proper time relationships. Sites were arranged in a vertical column with the most recent at the top of the table to the oldest at the bottom according to the adjusted seriated sequences of pottery, points, and blades. The number of specimens found on each site is listed under its appropriate category.

TABLE 3.—*Distribution of miscellaneous artifacts at various sites, arranged according to the temporal sequence based on ceramic and projectile-point and blade seriations*

Site	Ax: crude	Celt: crude	Celt: pecked/polished	End scraper (hafted)	End scraper	Side scraper	Graver	Drill	Mano	Hammer-anvil stone	Pipe: chlorite	Pipe: clay	Soapstone vessel fragments	Quartz crystal	Pendant
Ceramic:															
HD-2												2		3	
AU-35-M										2	1				1
AU-44	1														1
AU-35-V-1			1					2							
AU-5			2		3	1		2					2		
AU-45		1	1			1		4							
AU-46										2					
AU-31		4	16		1			5			1				
AU-21	1	1	1		1										
RM-4		12						1		1				1	
AU-13		5			3		1	1				2	9	1	
AU-11	2	12	4					4			1		2	1	
AU-26													3		
Preceramic:															
AU-4		1	1					2							
AU-41				1	2	1									
AU-36					3										
AU-43													1	1	
HD-4				1	7										
HD-6					1										
AU-25	1			1	1		1								
AU-18	3	4	2								1				
AU-16				1											
RM-12	1				1										
RM-1	3		1	2											1
RM-6					1										
RM-11					2								2		
AU-33	1			1	4			1		1					
AU-17					1			1							
AU-38								1							
AU-24	7	3						2							1
AU-40	2	1		1	1		1								
AU-23		1			1								1		
RM-5	1						1								
AU-32			1												
AU-14	1	3													
AU-15					1										
AU-22					1										1
AU-32			1												
AU-8		1													
AU-34					1	1									

The number of artifacts for each category is too small to be useful for any other purpose than absence or presence in certain periods of the time sequence. Reliable trends are not observable for such small collections. Examination of table 3 presents some interesting groupings of artifacts as a result of plotting them in a temporally ordered sequence. In the ceramic horizon, drills, polished and pecked celts, chloritic schist and clay pipes, fragments from soapstone vessels, and natural quartz crystals are most common. In the preceramic sites, crude axes, end scrapers, and the hafted variety of end scrapers are found in greater numbers. What this means is that if these artifacts are found in sufficient numbers at a site they may be useful in establishing the general position of the site in the ceramic or preceramic time sequence for the area. From another point of view these artifacts of infrequent occurrence can serve as an excellent check on the other data from a site. For example, if a site seems to conform to one part of the time sequence but has a series of celts, pipes, drills, etc., which seem to fit more closely to the opposite part of the sequence, the data suggest that possibly the site had been occupied by two groups at widely different times and some method must be derived to separate the artifacts into two distinct groups. For this purpose of serving as a double check, the less abundant miscellaneous artifacts were always considered in this study.

ANALYSIS AND INTERPRETATION OF THE POTTERY

Since the aboriginal pottery from Virginia has been analyzed and interpreted in the survey made by Evans in 1950 and published under the title "A Ceramic Study of Virginia Archeology" (1955), it is essential here to classify the pottery from northwest Virginia into Evans' types and seriated sequences. In order to assure the comparability of pottery classification of the earlier study and the materials from the current survey, Evans classified all the pottery in this study. One major aboriginal ceramic area, the Allegheny (op. cit., pp. 103–108) of Virginia applies to the present survey. Evans has divided the Allegheny Ceramic Area into a Southern Division and a Northern Division with the whole region covering the area west of the Blue Ridge Mountains. Although the pottery types most typical of this area predominate in some sites, an interesting situation occurs in those sites bordering the boundary line of the Central and North Central Ceramic Area, which suggests direction of the aboriginal movement or diffusion into northwest Virginia.

A study of the sherd collections from the survey area reveals five of the eight major Virginia pottery series present in various degrees of popularity. They include the Albemarle, Marcey Creek, New River, Radford, and Stony Creek Pottery Series. A thumbnail summarized description of these follows, but the reader is referred to Evans' (1955) report for the complete descriptions, photographs, and line drawings of rims and vessel shapes.

Albemarle Pottery Series (Evans, 1955, pls. 4, 5, 6, fig. 3):

A group of pottery types on a ware typically light red to orange, sometimes gray-red, sandy textured with a crushed-quartz temper (rarely with crushed granite or greenstone) which are angular, medium to large particles. Manufactured by coiling. Decoration consists of punctures with a sharp stick or narrow slits on the rim. In the majority of cases the rim is fairly vertical or tapers slightly inward and only rarely slopes outward. The shapes are typically round-bodied pots with straight sides or with a slightly constricted collar and short vertical rim.

The above-mentioned ware has been classified into five pottery types based on surface treatment: Albemarle Plain, Albemarle Cord Marked, Albemarle Fabric Impressed, Albemarle Net Impressed, Albemarle Simple Stamped, and Rivanna Scraped. Albemarle Cord Marked surfaces had been beaten with a cord-wrapped paddle, the cord being, in most cases, a simple, double-twisted, two-strand cord ranging from medium to coarse in size. The surface was paddled when the clay was moderately soft. The fabric impressions had been made with a plain plaited fabric with close, fine weft and a medium coarse to wide, heavy warp. Albermarle Net Impressed variety had been marked with a wide open knotted net deeply impressed in wet clay.

Albemarle Simple Stamped had been beaten with a paddle wrapped either with smooth thongs or roots or a paddle with faint grooves. Rivanna Scraped variety was produced by an irregular tool when the clay was very wet.

Marcey Creek Pottery Series (Evans, 1955, pl. 12, fig. 6):

A group of pottery types characterized by a light-tan to red-brown to gray-red color, soft paste, soapy texture and feel, crushed-steatite temper, very irregular, uneven, lumpy surfaces. The majority of vessels were apparently hand modeled, patched, or kneaded, while a few sherds suggest coiling. The rims are fairly thin compared to the body wall and are either vertical or out-sloping. There is an occasional nicked rim by way of decoration. The sherd samples suggest direct copy of typical steatite vessels which are either oval or rectanguloid bowls with flat bases, irregular surfaces, curved to straight sides with an occasional handle at the ends.

Two types are recognized: Marcey Creek Plain and Selden Island Cord Marked. The plain type is smoothed by hand only, rough to the feel, very uneven and irregular with lumps of temper protruding through the paste. Selden Island Cord Marked, impressed with a cord-wrapped paddle, has a haphazard, overlapping, crisscrossing or diagonal pattern.

New River Pottery Series (Evans, 1955, pl. 13, fig. 7):

A group of pottery types on a ware characterized by a gray-tan surface, with crushed-shell temper, incompletely fired in an oxido-reducing atmosphere producing a gray-cored paste. The majority of the sherds suggest modeling or patching as the method of manufacture. Decorations, which are frequent on the rim sherds, are gashes, finger pinchings along the lip, lower edge of the folded-over rim or along the collar. There are rounded loop handles and generally the shapes are round jars with globular bodies, short to medium-sized necks, the orifice smaller than the greatest body diameter and with a recurved or vertical rim.

Four types have been defined. New River Knot Roughened and Net Impressed has been paddled or rubbed on the exteriors with a knotted net, leaving a coarse, rough surface with impressions of knots and a few of the mesh lines. Usually the mesh of the net is obliterated, suggesting roughening with a crumpled net. New River Cord marked type has been haphazardly beaten with a cord-wrapped paddle forming parallel or crisscrossing patterns. Nonoverlapping, parallel impressions are most common. New River Fabric Impressed type was treated with a fabric of plain-plaited or twisted varieties. Often the fabric has been applied several times in one area as if wrapped on a paddle or around the hand. New River Plain has both interior and exterior surfaces smoothed over, but is still fairly uneven and irregular; sometimes the interior is scraped.

Radford Pottery Series (Evans, 1955, pls. 16, 17, fig. 9):

A group of pottery types on a ware characterized by gray to gray-tan color, a gray to black core resulting from incomplete firing in an oxido-reducing fire, crushed-limestone temper, and with distinctive rim and vessel shapes. The rims are either incurving, straight, or incurving with a thickened or folded-over lip, decorated with finger pinching, small gashes, lightly incised lines and, rarely, a raised rib. There are infrequent strap handles. They were generally made by hand modeling or patching, although some sherds show coiling. The vessels are rounded jars with globular bodies, the orifices of which are smaller than the bodies.

This series has four pottery types. The surfaces of Radford Knot Roughened and Net Impressed had been beaten with either a net-covered hand or paddle, creating a haphazard, overlapping, rough surface with knot and cord impressions. It was apparently treated when the clay was leather dry. Radford Cord Marked type had been beaten with a cord-wrapped paddle without too much overlapping or crisscrossing. Radford Fabric Impressed sherds are impressed with a plain-plaited or twined fabric. The majority suggest that this fabric was wrapped around a paddle or the hand and the exterior surface beaten or rubbed. Radford Plain Type is smooth but uneven.

Stony Creek Pottery Series (Evans, 1955, pls. 18, 19, 20, fig. 10):

A group of pottery types characterized by fine quartz sand temper, gritty and sandy texture, light tan to light orange or light red-tan surfaces, fired in an oxidizing atmosphere. Coiling as the method of manufacture is evident on the majority of the sherds. Typically, there is no decoration. A variety of shapes were reconstructed from the sherds. There were deep open bowls with subconoidal to conoidal bases; globular-bodied jars with conoidal bases and with insloping straight sides forming an orifice smaller than the body diameter, and tall pot forms with conoidal or subconoidal bases.

Seven types are recognized. Stony Creek Cord Marked has been treated with fine to medium-fine cords, typically in a crisscrossing, well-executed, overlapping pattern, usually diagonal to the rim. Stony Creek Fabric Impressed type is difficult to analyze because the sandy nature of the paste caused the sherd surfaces to erode easily. A characteristic of the type is the faintness of the fabric impressions even on uneroded surfaces, suggesting application when the clay was leather dry. Stony Creek Simple Stamped sherds have been beaten with a paddle wrapped with smooth thongs or thin, smooth roots or grass. The decorated type, Nottoway Incised, has the exterior treated as the fabric-impressed type, then the incisions were made with a flat, blunt stick, applied crudely and unevenly to the rim and body. Motifs are diagonal lines extending from the lip, haphazard crosshatching, double chevrons, paired lines, and triangles. Stony Creek Plain has smoothed, fairly even and regular interior and exterior surfaces. Rivanna Scraped is scraped or combed with a tool, leaving small irregular serrations.

The basic differences in temper, paste, firing, manufacture, and decoration of each pottery type are fairly easy to distinguish once one has had a little experience with pottery typology and classification. The numerical and percentage breakdown by series for each sherd collection arranged by site is found in the Appendix, table 7. The percentages were plotted as bars on strips of graph paper with a scale of 1 cm. equal to 10 percent arranged in columns wide enough to accommodate the greatest percentage in any one series. A collection of 50 or more sherds was considered usable with a fair degree of accuracy (Ford and Willey, 1949, pp. 35–37); these were plotted as solid bars. The four collections with sherd samples between 22 and 47 were plotted with diagonal lines to suggest uncertainty of the results due to a small sample.

The bottom of the seriation (fig. 8) was fixed, in part, by reference to Evans' ceramic study (1955, fig. 18). He had noted pottery types characteristic of the Central and North Central Ceramic Area spilling over into the northern district of the Allegheny Ceramic Area (ibid., pp. 103, 108). Therefore, reference to his seriation in the former area indicated that sites with a high percentage of Stony Creek Pottery Series, relatively smaller percentages of Albemarle Series, and the presence of Marcey Creek Series are in the lowest part of the sequence.

The bar graphs of two sites, AU–26 and AU–11, having the three requirements mentioned above were placed at the bottom of the seriation (fig. 8). According to Evans' study the Stony Creek Series would fade as the Albemarle Series blossomed (ibid., p. 100, fig. 18); the next four sites (AU–13, RM–4, AU–31, and AU–21) were arranged accordingly. Good trends, though foreshortened by the limited number of sites, appeared. The Stony Creek Series decreased from 60 percent to 10 percent, while Albemarle increased from 32.2 percent to 89 percent.

Following on the six-site sequence developed above, six more sites (AU–45, RB–3, AU–5, AU–35–V–1, AU–44, and AU–35–V–2) with Albemarle and Stony Creek Series were seriated to continue and develop the best trends of the first six sites (fig. 8). It became immediately apparent that a new ceramic influence had reached the area. The Stony Creek Pottery Series, as expected, continued to decline to 3.2 percent and 2.7 percent, but the Albemarle Series, instead of continuing to increase as it had in the Central and North Central Ceramic Area, began to fade as the Radford Pottery Series blossomed. This new influence, although present in low percentages (up to 5.8 percent) at the bottom of the seriation increased to 40.3 percent at the top of the 12-site sequence.

The five remaining sites with ceramic samples presented a problem. Four had high percentages of Radford Pottery Series, only one had a trace of Albemarle, and only one had any Stony Creek Series. Were the samples (HD–9 and RB–7) found in the two museum collections so

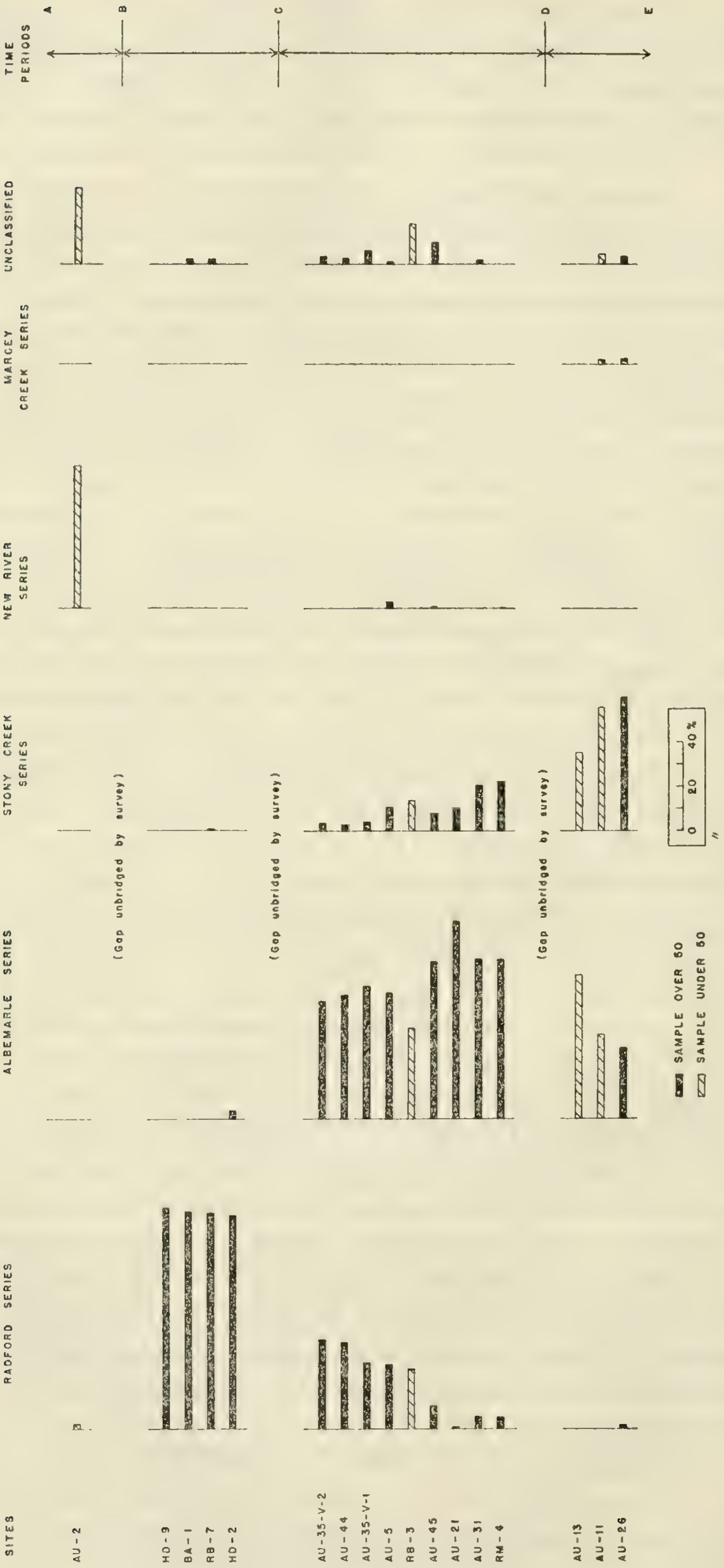


FIGURE 8.—Seriated sequence of sites based on pottery.

highly selected that they would not show any trends in a seriation study? Traces of the New River Series had been present in the 12-site sequence already developed and there was none in the four samples with a high percentage of Radford Series. The fifth site had a high percentage of the New River Pottery Series and a very low percentage of Radford Pottery Series.

To resolve these difficulties it was decided to seriate the four sites (HD–2, RB–7, BA–1, and HD–9) with the high percentages of the Radford Series as a group to continue the trends which had been developed by the sequence (fig. 8). HD–2, an excavated midden, had a trace (3.5 percent) of Albermarle Series and the lowest percentage of Radford Series (96.5 percent). This was placed on the bottom of this four-site sequence, and the others fell into place with increasing percentages of Radford Series and an absence of Albermarle. Obviously, then, a gap existed in the sequence. More sites would doubtlessly bridge the gap by showing a progressive loss of Albermarle and an increasing percentage of Radford. Stony Creek Series pottery, which had already declined to a trace, would either continue as a trace (as on RB–7) or would be absent entirely. The probabilities are that the New River Series would not appear in any large percentages and more than likely would be absent on most of the sites.

The question of selectivity of sherds in the museum samples (HD–9 and RB–7) is not answered positively. However, they seriate well with two excavated middens having 96.5 percent of Radford Series or more, which indicates that there was a blossoming of the Radford Series to such a degree that it represented practically the entire ceramic complex on certain sites in the survey area.

The question now arose as to whether the top of the seriated sequence was represented by the blossoming of the Radford Series (fig. 8). This did not seem possible for two reasons. In the northern district of the Allegheny Ceramic Area, the Keyser Farm site, proposed by Griffin as having been occupied in the post-Columbian era (Manson, MacCord, and Griffin, 1944, p. 413), had a ceramic complex with variants of the Radford and New River Pottery Series. With this temporal assignment and the trace of New River Series in sites so far discussed, it was expected that the top of the seriation had not been reached. In the southern district of the Allegheny Ceramic Area the excellent sequence developed by Evans (1955, fig. 19) showed that here Radford blossomed at the bottom of the sequence and faded with the expanding of the New River Series. With these two studies as guides, it was obvious that the top of the seriation sequence should be represented by relatively large percentages of the New River Series and either no Radford Series or moderate percentages of it. The only site to fit this distribution is AU–2, and, therefore, it has been placed at the top of the seriation (fig. 8). Again the intervening sites with Radford Series pottery declining and New River Series pottery increasing have not been discovered as yet in the survey area. This lack is shown on the seriation chart by a gap.

In summary the following generalizations may be made: The earliest ceramic complexes of the Central and North Central Ceramic Area existed coevally in the northern district of the Allegheny Ceramic Area. Two distinctive ceramic complexes, limestone-tempered Radford Pottery Series and shell-tempered New River Pottery Series, moving in from the west or southwest, disrupt the ceramic patterns of this latter district but do not have any influence on patterns in the Central and North Central Ceramic Area. The earliest of these new ceramic influences, the Radford Series, appears in percentages of 96.5 to 100 percent at a relatively later period in the area of this survey than it does in the southern district of the Allegheny Ceramic Area. In the southern district it appears as a well-developed complex at the bottom of the seriation for that area. In the survey area there is a gradual transition from the Albemarle and Stony Creek tradition to the 100 percent Radford tradition. The late ceramic influence, the New River Series, is not well represented in the survey area but its occasional presence is of importance in marking the most recent time levels.

Let us compare the results of the point and blade seriation (fig. 5) and the seriated sequence based on pottery (fig. 8), which were derived independently of each other. It was impossible to collect uniformly large samples of both pottery and chipped-stone materials from ceramic-bearing sites. Therefore certain sites appearing on the ceramic seriation are not found on the projectile-point and large-blade study, and vice versa, although a tabulation of the artifact sample is shown in tables 6 and 7 of the Appendix. Although there is not 100 percent agreement in the order of those sites that appear in both sequences, a sufficient number are in the same relative positions to suggest that the two forms of evidence can be used independently with some degree of accuracy. To be specific, the relative positions of sites AU–11 and AU–13 are the same—at the bottom of the pottery-type sequence and at the beginning of the ceramic-bearing sites in the point and blade sequence. However, their sequential positions are reversed, a matter of not too serious concern at this stage of the comparison. Sites AU–21, AU–45, AU–35–V–1, and AU–35–V–2 maintain not only their relative positions but also their sequential positions. It will be recalled that although the stone artifact sample of RM–4 was so mixed with RM–4A that it was impossible to separate the various cultural complexes and use the sample successfully in the point and blade seriational studies, the pottery sample was clearly a unit in itself. Its position near the bottom of the pottery sequence helps smooth out this part of the curve.

There is little doubt that about twice the number of sites with large enough pottery samples to use would have helped smooth out the seriational sequence based on pottery, for there are apparently three distinct gaps (fig. 8) not bridged at the moment by the available sample of this survey. Nevertheless, with the support of these standard ways of developing sequences by seriation of pottery, points, and blades, several unique approaches will now be proposed and can be checked against the results of the established sequences.

ROCK MATERIAL

It became apparent early in the survey that the type of rock from which the artifacts were made would be of considerable importance. This was not only determined by the present survey but had been observed, although not fully developed, in the earlier general Virginia survey (Holland, 1955, pp. 175–176). For example, in Albemarle County to the east, it was found that preceramic sites showed a preference for quartz with quartzite of secondary importance. In the Stony Creek district there was preference for quartzite in the early ceramic horizon. Late ceramic sites in southwest Virginia showed a rock material preference for chert. In other words there was diversity of popularity of rock material at various time levels and in various localities. No definite conclusion could be drawn at the time except that although some cultural preference probably existed, the convenience of local supplies appeared to be the greater determinant.

Directly north of the survey area, Fowke (1894) described differences in popularity of rock material at various sites. At the Kite Place in Page County (op. cit., p. 44), which adjoins Rockingham, he mentioned that a peck of well-finished quartzite arrowpoints or spearheads was found in the center of a mound. On the Phillip Long Farm (op. cit., p. 46) in the same county there were flint and crystal artifacts. At Ruffner Place (op. cit., p. 48) he noted the presence of both quartzite and flint in quantity. At Rileyville, on the Huffman Farm (op. cit., p. 55), he noted eight triangular, black flint knives and "Two feet from these, at a slightly lower level, was a double handful of quartzite chips and spalls." In other words, flint (actually chert and not true flint) and quartzite had been reported by others to be popular in the area covered by the survey. A distinction in time might exist, but it was not clearly discernible from Fowke's writings.

At the beginning of the survey I realized that certain sites would not have a sufficient number of chipped-stone artifacts to integrate them into a seriation study; however, on these same sites chips were abundant. I concluded that if time distinctions could be shown by preferences of rock in the manufacture of chipped-stone artifacts, an advantage could be derived from a study of chips. Those sites with adequate collections of artifacts could serve as controls in the study of the chips.

A chip was defined as the more or less flat flake removed either by percussion or pressure during manufacture of stone artifacts. Large angular chunks, called cores, were not included since their occurrence was not common enough on each site to be of any practical use. It was believed that 100 or more chips would preclude any gross percentage error caused by accidental breakage. The chip size varied from minute fragments obviously removed by pressure flaking to large spalls, 4 by 8 centimeters, with pronounced striking platforms.

At first, chert was divided by color, jasper and chalcedony were kept separate, quartz was divided into clear (crystal or near crystal) and white (milky) types, and quartzite by color. In the "South Rivers District" quartzite is usually gray or tan and in the western portion of the survey area there is a preference for a purple Erwin quartzite. Greenstone did not appear divisible into smaller categories, although green and bluish phases were recognized. Preliminary study revealed these smaller divisions were purposeless, thus classification was reduced finally to chert (sometimes including a very small percentage of jasper and chalcedony), quartz, quartzite, and greenstone.

A special technique was devised for collecting the chips. Careful inspection was made of the entire site to note the surface distribution of the chips representing all types of rock materials and particularly to see if any concentrations were present. Sites under cultivation were ideal for this phase of observation. If no concentrations existed, it was part of the technique to pick up every chip until 100 or more had been accumulated. If a concentration did exist, a separate collection was made from it as well as other areas and the results compared. The technique was tested by collecting several samples months apart and from varying sections of a site. The results of this have been incorporated into the site descriptions, especially sites AU–4, AU–11, and RM–4B.

The numerical and percentage occurrence of types of rock material will be found in horizontal columns at the bottom of table 6 in the Appendix. If two collections have been made, they have been placed in the tables as collections A and B, each with separate percentage calculations.

A crucial test for use of chips in this study is the correlation between the percentage occurrence of the various rock materials of chips and projectile points and blades. A selection was made of those sites with 99 or more points and blades, and the percentage occurrence of rock material for both artifacts and chips is shown in table 4.

TABLE 4.—*Comparison of the percentage occurrence of the rock types based upon a study of the chips versus the points and blades from the same sites*

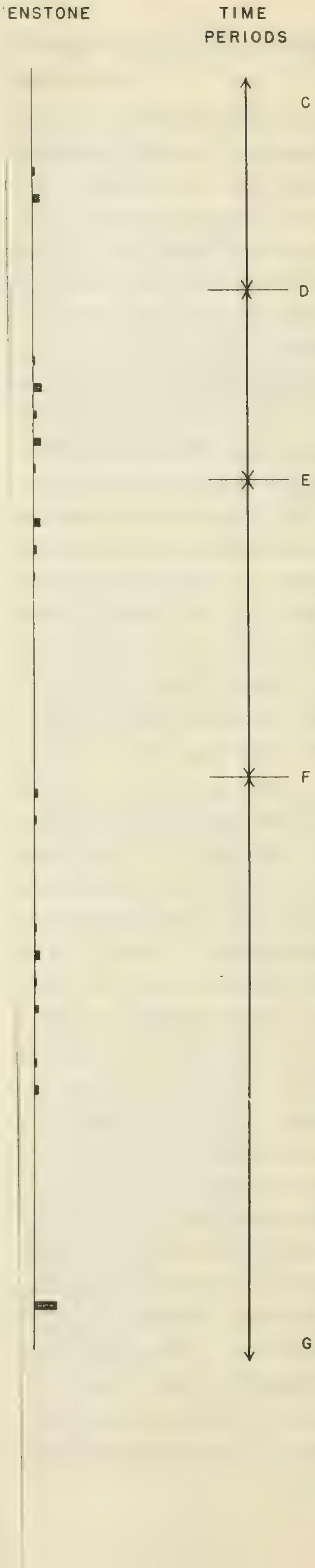
Site	Chert			Quartz			Quartzite			Greenstone			Total	
	Artifact	Chips	Difference	Artifact	Chips	Difference	Artifact	Chips	Difference	Artifact	Chips	Difference	Artifact	Chips
	Percent	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*
AU-4	79.6	90.0	10.4	1.3	1.2	0.1	19.1	6.4	12.7	0.0	2.4	2.4	100	100
AU-5	76.0	94.2	18.2	7.2	3.5	3.7	16.8	2.3	14.5	.0	.0	.0	100	100
AU-36	75.4	86.4	11.0	4.6	6.4	1.8	20.0	6.0	14.0	.0	1.2	1.2	100	100
AU-45	76.5	76.5	.0	.8	16.4	15.6	22.7	7.1	15.6	.0	.0	.0	100	100
RM-4	82.0	80.0	2.0	3.0	15.0	12.0	15.0	4.3	10.7	.0	.7	.7	100	100
HD-4	83.1	85.0	1.9	5.0	3.4	1.6	11.9	11.6	.3	.0	.0	.0	100	100
AU-11	20.0	21.0	1.0	20.0	20.4	.4	60.0	58.6	1.4	.0	.0	.0	100	100
AU-13	23.7	19.6	4.1	14.3	12.1	2.2	62.0	67.0	5.0	.0	1.3	1.3	100	100
AU-24	10.8	4.0	6.8	16.2	17.0	.8	70.5	78.0	7.5	2.5	1.0	1.5	100	100
RM-8	12.4	6.5	5.9	6.1	6.0	.1	81.5	87.5	6.0	.0	.0	.0	100	100

The third column shows the difference in percentage between the artifact and chip collections. At first glance it might suggest a lack of conformity, and it is true that the chip collections tend to exaggerate materials of high percentage occurrence and minimize popularity at low percentage levels. However, of the 35 paired samples of rock materials plotted in table 4, 18 show a difference of 2.4 percent or less between the two collections, and 25 show a difference of 7.5 percent or less. This means that in 50 percent of the collections the conformity is within 2.4 percent, suggesting that there is sufficient reliability in the chip collections to make them usable for the study of rock materials. The necessity of using such collections became evident when so many sites were examined which had a small assemblage of classifiable artifacts but which produced a fairly large collection of chips. Granted, the use of chips to determine the popularity of rock materials through time and space might not be as sensitive an indicator as stone artifacts or pottery, the fact that so many sites in northwestern Virginia produced so few artifacts made it necessary to exhaust every possible bit of evidence.

One slight discrepancy appears upon careful scrutiny of table 4. Greenstone appears to be present more often in chip collections than in point and blade collections. Since greenstone was used mainly to fashion axes and celts, the table does not correctly reflect the situation. If this factor is kept in mind and the tabulation of other artifacts from the various sites is consulted in table 6 of the Appendix, greenstone is found just as often in the artifacts as in the chip collections. However, it is clear from table 4 that chert and quartzite will undoubtedly be the most useful rock materials in this study owing to their individual popularity at certain sites.

If popularity of rock materials has temporal and spatial significance, the problem can be approached by plotting sites on a map and by seriation. The latter problem will be attacked first. By seriation of sites on a basis of increasing or declining percentages of one or the other most popular rock materials (quartzite or chert) a smooth curve of transitition develops, but it is impossible to tell the top and bottom of the chart without reference to the seriation sequences already described. Therefore the relative position of sites in the adjusted ceramic and projectile-point and large-blade seriations were listed in a column from the most recent at the top to the oldest at the bottom (fig. 9). The percentages of rock materials based on chip collections, plotted as bar graphs, were then inserted into columns opposite the sites where a chip collection existed or was large enough for percentage calculations. After this, sites with adequate collections of chips but so few artifacts that they had not been placed in the seriated chipped-stone sequence now were interdigitated as they best fitted.

Beginning at the bottom of figure 9 it will be noted that 21 sites, representing the oldest horizon, have no less than 63 percent quartzite and no more than 26 percent chert. All the sites above this lowest sequence, with the exception of AU–13, AU–11, and AU–26, reveal an abrupt reversal in popularity of the two types of rock. Here, in the upper part of the chart the lowest percentage occurrence of chert is 59.4 percent and the highest of quartzite 28.8 percent. For the moment, ignoring the three sites that appear out of place and are indicated on figure 9 with a bracket around them (AU–13, AU–11, and AU–26), sites with high percentage of chert represented in the upper part of the sequence can be divided into two distinct categories: preceramic and ceramic. Sites HD–5, RB–5, HD–3, AU–10, AU–48, HD–6, HD–7, AU–47, RB–6, AU–36, AU–37, and AU–4 have no pottery and the rock material is predominantly chert. Because of the decided shift in popularity of rock materials from quartzite to chert, the terms "quartzite-using" preceramic complex and "chert-using" preceramic complex had been used. This sudden shift from one material to another in figure 9 suggests that there is possibly some factor involving areal distribution rather than one solely representing a change of popularity of material throughout time. Further suspicion of this factor is raised as a result of the position of sites AU–13, AU–11, and AU–26 in this graph of rock materials. In their present position in this sequence, they are obviously out of place, for they produce a decided disconformity in the trends of the popularity of quartzite and chert. They are the only three sites in the entire se-


ENSTONE
TIME PERIODS
C
D
E
F
G

quence that do not seem to fit the rock material trends. What is the reason?

Looking back to the final seriation of projectile points and blades (fig. 5) it will be noted that AU–11 and AU–13 (AU–26 had too small a sample of only 16 artifacts to plot) are the earliest sites in the sequence with pottery before the transition to preceramic sites. The fit at this place in the sequence is not bad, but if it had not been assumed that pottery sites were always later than preceramic sites, these two sites could have actually fit just as well a few steps further down the sequence. Looking at the sequence of sites with pottery (fig. 8) originally seriated independently from the point and blade seriation, the same three sites are at the bottom of the sequence. In fact, site AU–26 with a fairly reliable pottery sample stands out as if out of place in comparison to the popularity of other pottery types owing to 60 percent occurrence of Stony Creek Pottery Series. Although the site, along with AU–13 and AU–11, fits at the bottom of the pottery sequence owing to the high percentage of Stony Creek pottery, there is obviously some gap between these sites and the others. Either more sites with this type of pottery exist in the area and were not found in the survey or some other explanation must be sought. With this situation in mind, let us return to the rock-material chart (fig. 9).

The site order on this chart is that derived by the seriation of the pottery types and the points and blades. The only sites that appear to be badly out of position in the rock-material sequence are AU–13, AU–11, and AU–26. To produce a smooth trend, these would have to be moved to the upper limit of the quartzite-producing sites, adjacent to AU–17. However, this would put these three ceramic sites in the midst of a series of nonceramic sites, with the implication that these sites had a pottery-making culture while the rest of those in the area were nonceramic.

To evaluate further the position of AU–13, AU–11, and AU–26 in the rock-material sequence, the problem of areal distribution must be considered. To investigate this factor, sites used in the seriation of rock material in the "quartzite-using" preceramic horizon were plotted on a map (fig. 10) as crosses, the sites in the preceramic "chert-using" horizon were plotted as circles, the three sites with a high percentage of quartzite in the ceramic period (AU–13, AU–11, and AU–26) were plotted as triangles, and the other ceramic horizon sites were plotted as squares.

This arrangement demonstrated definitely that an areal factor is involved. All preceramic "quartzite-using" sites are located in the valleys of the two South Rivers and extend up the South Fork of the Shenandoah River. The ceramic sites with high percentages of

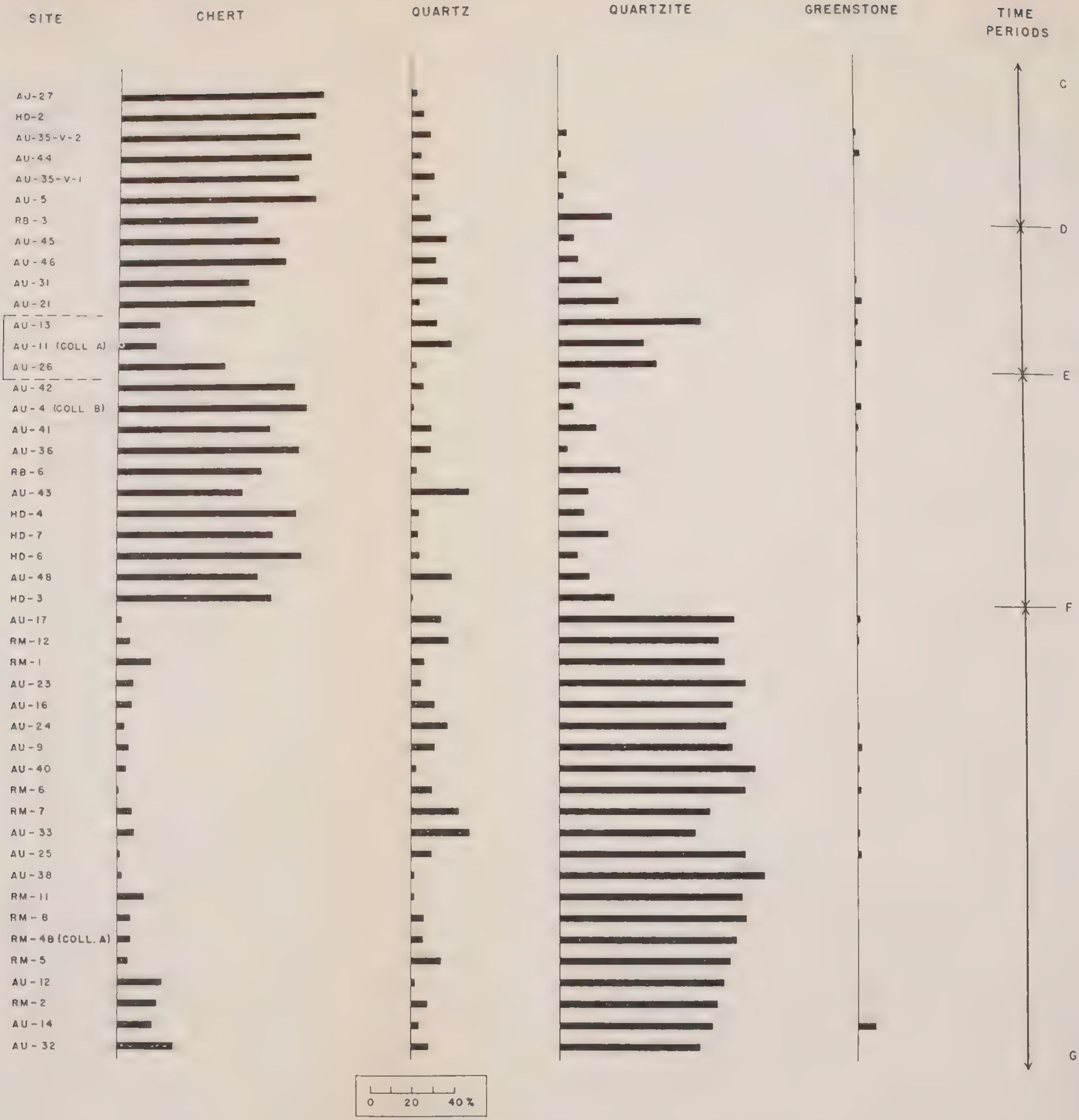


Figure 9.—A temporal sequence based on rock types.

471762 O -60 (Face p. 69)

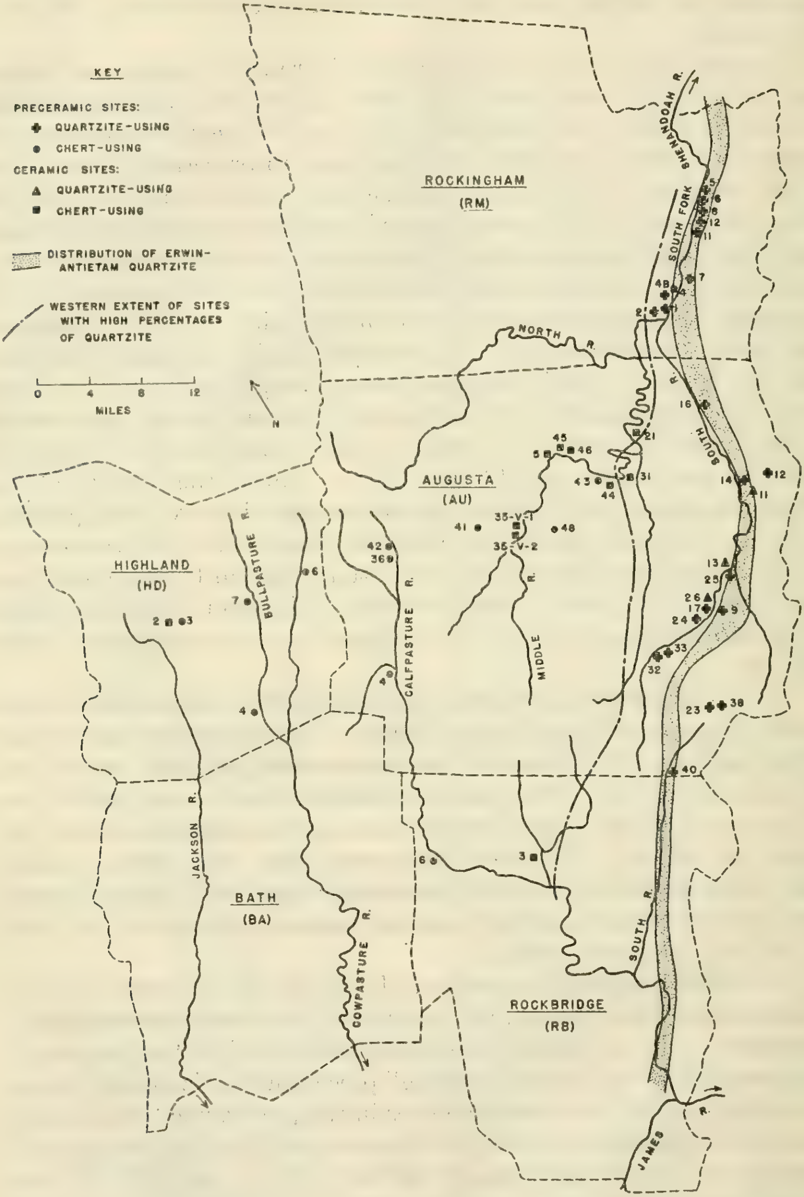

KEY
PRECERAMIC SITES:
✚ QUARTZITE-USING
● CHERT-USING
CERAMIC SITES:
▲ QUARTZITE-USING
■ CHERT-USING
DISTRIBUTION OF ERWIN-ANTIETAM QUARTZITE
WESTERN EXTENT OF SITES WITH HIGH PERCENTAGES OF QUARTZITE
0 4 8 12
MILES
N
ROCKINGHAM
(RM)
AUGUSTA
(AU)
HIGHLAND
(HD)
BATH
(BA)
ROCKBRIDGE
(RB)
SHENANDOAH R.
SOUTH FORK
NORTH R.
SOUTH R.
MIDDLE R.
CALFPASTURE R.
BULLPASTURE R.
COWPASTURE R.
JACKSON R.
JAMES R.

FIGURE 10.—Distribution of "quartzite-using" and "chert-using" sites of the preceramic and ceramic horizon.

quartzite are found only along the South River (into South Fork of the Shenandoah). As has been stated in the description of the survey area, quartzite is readily available locally.[1] All the ceramic or preceramic sites, except one, with a high percentage of chert are found west of this South Rivers District. In this western area chert is readily available as inclusions or strata in the limestone.

Further evidence of the influence exerted by availability of raw material is brought out by an examination of the distribution of the ceramic complexes. As shown by figures 11 and 12, pottery of the Stony Creek Series and of the Radford Series moved into this part of Virginia from opposite directions. The diffusion of ceramic types, however, was not accompanied by a diffusion of the rock preference associated with these pottery types in the place of immediate origin. This is most clearly shown in the case of the Stony Creek Series, which moved in from the east, a predominantly quartzite-using area. When this pottery diffused westward beyond the South Rivers District, the preference for quartzite for blades and projectile points did not move with it. Instead, the people in this western region continued to make their projectile points of chert.

The conclusion that availability of the raw material was the primary factor in explaining the geographical distribution of two preceramic cultures distinguished in this part of Virginia does not mean that no cultural distinction exists. The fact that there are two cultures rather than one is shown by the seriation. If there was a single culture, one would expect the seriated sequence in the two areas to be comparable, so that interdigitation would be possible. However, the lack of overlap makes it clear that two separate cultures are represented.

In concluding this discussion of the analysis of chip materials it is mainly pertinent to point out that certain conclusions, discrepancies, and interpretations (explained fully in the section on relationship of sequences of the report, pp. 80–88) are added or strengthened as a result of this approach. Chip studies permitted more sites to be utilized in the survey than would otherwise have been possible because many sites produced only a few artifacts but a large amount of chips, thus extending the area and accuracy of the study. As a result of the fact that choice of rock materials shows temporal, areal, and cultural differences, several discrepancies in the sequences derived from seriation of points and blades were revealed. As previously pointed out

---

[1] From the geologic map of the Appalachian Valley in Virginia (Butts, 1933) the outline of the natural occurrence of quartzite was transferred to the map (fig. 10) showing the sites according to their preferences for rock materials. This area is shown by stippling and extends along the South Fork of the Shenandoah River and the two South Rivers. For purposes of this report this area has always been referred to as the "South Rivers District." A heavy dot-and-dash line shows the western extent of all sites known to have high percentages of quartzite.

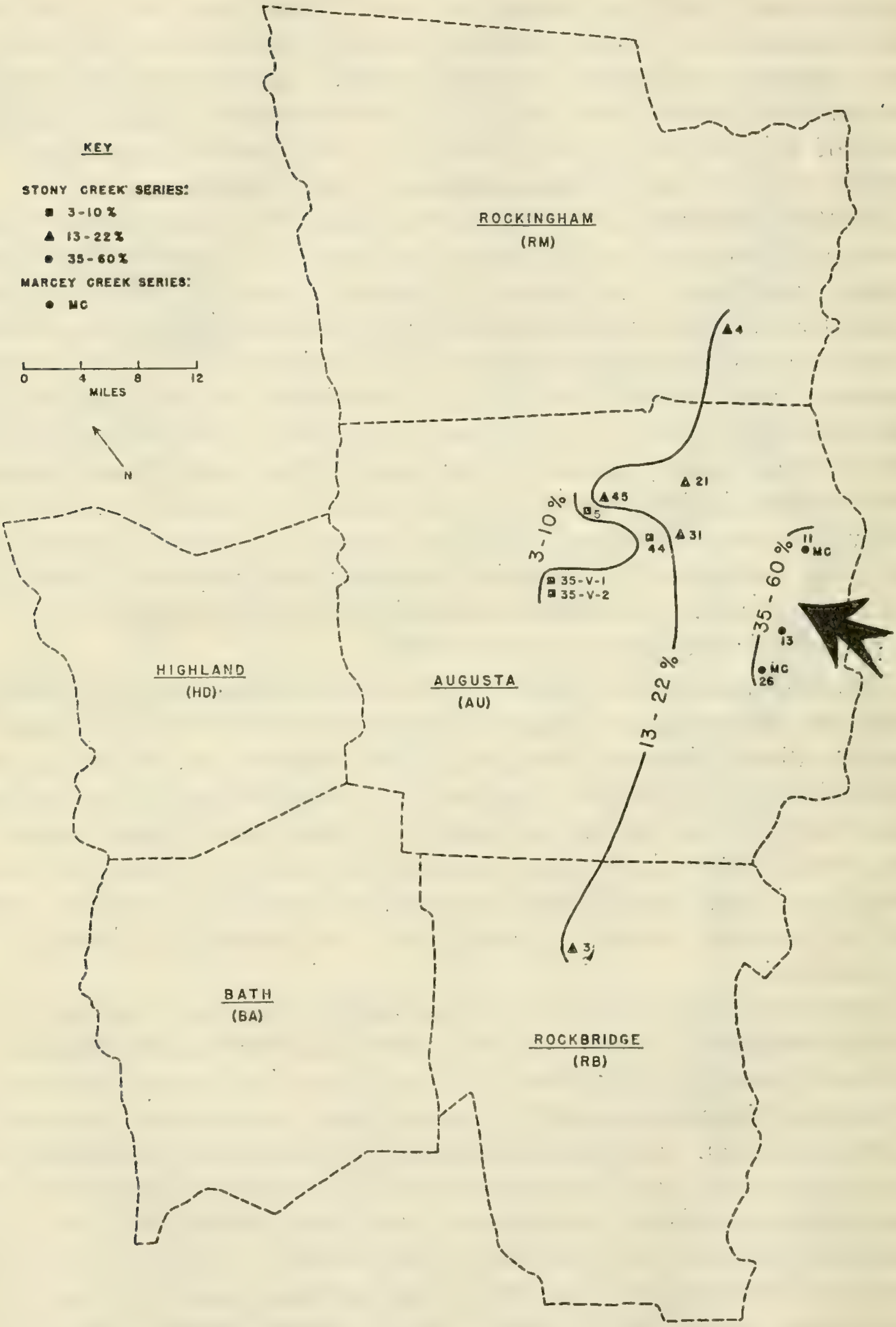

KEY
STONY CREEK SERIES:
■ 3-10%
▲ 13-22%
● 35-60%
MARCEY CREEK SERIES:
● MC
0 4 8 12
MILES
N
ROCKINGHAM
(RM)
HIGHLAND
(HD)
AUGUSTA
(AU)
BATH
(BA)
ROCKBRIDGE
(RB)
3-10%
13-22%
35-60%
4
21
45
5
44
31
35-V-1
35-V-2
11
MC
13
MC
26
3

FIGURE 11.—Direction of movement of the Stony Creek Pottery Series from the Central and North Central Ceramic Area into northwest Virginia.

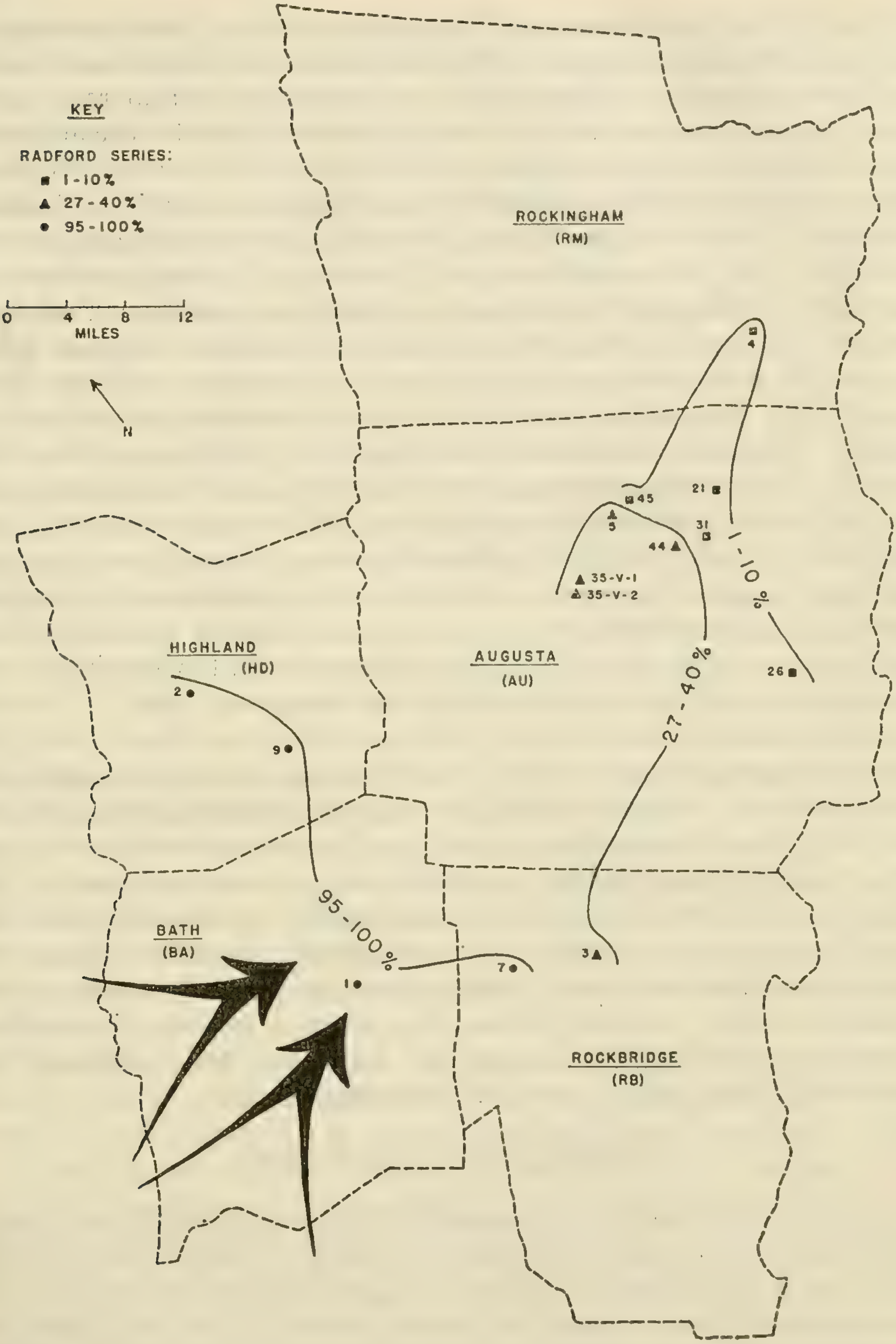

KEY
RADFORD SERIES:
■ 1-10%
▲ 27-40%
● 95-100%
0 4 8 12
MILES
N
ROCKINGHAM (RM)
HIGHLAND (HD)
AUGUSTA (AU)
BATH (BA)
ROCKBRIDGE (RB)
1-10%
27-40%
95-100%
4
45
21
5
31
44
35-V-1
35-V-2
26
2
9
1
7
3

Figure 12.—Direction of movement of the Radford Pottery Series into northwest Virginia.

in detail, the interpretation of the position and cultural meaning of sites AU–11, AU–13, and AU–26 would never have been demonstrated without this study. However, it must be understood that rock materials alone are not sufficient; these collections must be accompanied by adequate observation of the site and consideration of all the data. But they are unusually valuable in assessing the preceramic horizon to which a site with an inadequate collection of artifacts may be assigned. In the survey area, two preceramic horizons, exclusive of a possible Folsomlike horizon, are definable, each characterized by a marked preference for rock materials, one quartzite and the other chert. The "quartzite-using" preceramic horizon is confined to a set of sites in a narrow band of land at the western foot of the Blue Ridge Mountains described in this study as the "South Rivers District." The other preceramic horizon shows a preference for chert and is distributed widely west of the South Rivers District in Augusta, Highland, Bath, and Rockbridge Counties. In addition, the two ceramic horizons, one with a preference for quartzite and a high percentage of Stony Creek Series pottery and the other preferring chert and having a majority of Radford Series pottery, have a similar distribution as the two preceramic cultures mentioned above.

These distinctions in rock preference, when combined with the pottery-type analysis, permit a reconstruction of cultural movements into this part of Virginia and their degree of penetration to be discussed in more detailed and more complete terms than would have been possible using pottery or arrowpoint types alone (pp. 43, 58). This makes it seem likely that if comparable information were available from the surrounding area, more specific statements about the movements and settlement of aboriginal groups in the entire region could be made. It is hoped that this attempt to demonstrate their usefulness will stimulate others to undertake the collecting and analysis of chips when they visit archeological sites.

HABITATION PATTERNS

The absolute time span represented by the total number of sites in this study is not known with any certainty. However, some of the changes in the courses of the swift streams near sites give a clue to a considerable lapse of years and should correlate with the habitation patterns of each cultural group. These changes will be immediately apparent to a trained geologist, and even to an untrained observer the formation of terraces between a site and the nearby present-day river bed has considerable suggestive value of change through time. When a site of the ceramic period, such as RM–4, is located on the bank of a river, and 35 yards inland and 8 to 10 feet higher there is a preceramic "quartzite-using" station, RM-4B, with gross evidence of erosion between the two, the impression of change and age is unavoidable.

For years, local collectors have made several observations which, though impressionistic, are indicative of these geographical and cultural differences. In the valley of the Calfpasture River it had been noted that artifacts were not generally found on the banks of the river but on terraces at some distance from it. In the valley of the South River (into James) the general impression was that "flint" (chert) artifacts were found near the river and those of quartzite were found farther away. Indeed, during the survey, the pattern of site locations began to develop and it was of considerable interest to predict, with a certain amount of accuracy, the cultural horizon expected if given the geographical position of an occupational area. For example, while at AU-44, a site with a pottery tradition on Middle River, a local resident reported the presence of "arrowheads" on a hill south of the site. Conscious note was made of the prediction that it would probably be a site of the preceramic horizon. On investigation the area was in sod, but 23 quartzite, 5 quartz and 8 chert chips, 1 greenstone Unclassified Blade, and 1 quartzite Unclassified Point were discovered. There was no pottery. The material unquestionably belongs to a group who occupied the site during the preceramic "quartzite-using" horizon. At AU-21, an early ceramic site on Middle River, a 10-foot-high terrace parallels the river 50 yards from the riverbank where the site is confined. The bank and plateau of this terrace had been eroded. Before investigating the area it was predicted that, if any artifacts were found, they would belong to a preceramic horizon. In the eroded gullies quartzite chips, which are most common to one of the preceramic horizons, were found, but no artifacts.

These observations opened the problem of habitation patterns. Would it be possible to determine anything regarding cultural patterns, or age of sites, by the data which had been assembled? Undoubtedly many variable factors are present, and it is believed that no single site can be used as evidence for any particular hypothesis. However, it might be possible to use groups of sites and their temporal placement to minimize or accentuate these variables so they would form meaningful patterns.

For this discussion the sites will be used with the temporal designations that developed as a result of seriations. These six arbitrary divisions are briefly summarized: "A," the historic period; "B-C," the period in which the New River Pottery Series blossomed in popularity and the Radford Pottery Series declined; "C-D," the increase in popularity of the Radford Pottery Series; "D-E," the beginning of the ceramic horizon in this part of Virginia with the occurrence of the Albemarle Pottery Series; "E–F," the "chert-using" horizon of the preceramic period; "F–G," the "quartzite-using" horizon of the preceramic period.

With these time divisions as a guide, 61 sites, for which the data were available on distance and height from a stream, and from which an artifact, pottery, or chip sample had been classified, were plotted in table 5 with two vectors: horizontal—distance from the banks of present-day streams; and vertical—height above water level. The temporal placement of each site has been given according to the alphabetical time periods mentioned above. The distances from the stream bank are given in blocks of 30 feet with all sites beyond 90 feet plotted without further breakdown. The height of each site above water level is given in 10-foot units with sites above 30 feet plotted without further breakdown. For easy reference the blocks of table 5 were lettered horizontally and numbered vertically. To illustrate, AU–1, between 60 and 90 feet from Back Creek and between 10 and 20 feet above it, will be found in block C–2. Reference to table 5 throughout the following discussion is essential.

From the plotting of the sites, it is immediately apparent that the once-thought *absolute* correlation of preceramic sites on higher land some distance from the present-day streams, with all the ceramic sites on the terraces and bottom lands adjoining the stream banks, does not exist. In other words, if this impression had proved a fact, all the preceramic sites (i. e., sites with E–F or F–G time periods) would have plotted in the blocks most distant from the stream and in the greatest height above the stream, with all the ceramic-period sites falling in nearest block (i. e., block A–1). Inspection of table 5 indicates that such is by no means the case. However, there are some generalizations from the table that may shed light on either the age or cultural traits of certain groups of sites.

Since in the Eastern United States generally it has been agreed that pottery-using cultures are correlated with the introduction of sedentary village life and the development of extensive agriculture, let us first examine the location of all sites falling into any of the ceramic horizons. These sites are designated by the time periods A–B, B–C, C–D, D–E. By inspection of table 5 it is noted that sites with the designations of B–C seem to be scattered from blocks A–1 to D–4, that is, from the area closest to the stream in both distance and height, to the areas most distant in both dimensions. But looking up the descriptions of these particular sites gives us a better clue than the first inspection of table 5 would indicate. Height and distance from the stream unfortunately were not available for all the sites, so the absence of many late sites on the chart is noticeable.

TABLE 5.—*Schematic presentation of the geographical location and temporal position of sites with reference to river terraces*

Height in feet of site above stream				
30	Time period F-G RB-4 Block A-4	Time period B-C AU-27 Time period D-E AU-31, AU-46 Time period F-G AU-25 Block B-4	Block C-4	Time period B-C HD-2 RB-7 Time period E-F HD-6 AU-48 Block D-4
20	Block A-3	Block B-3	Block C-3	Time period F-G AU-9, AU-40 Block D-3
10	Time period F-G RM-1, RM-5 RM-6, RM-8 RM-12 Block A-2	Block B-2	Time period F-G AU-1 Block C-2	Time period E-F HD-4, RB-6 Time period F-G RM-2, RM-4B RM-7, RM-11 Block D-2
0	Time period A-B AU-2 Time period B-C BA-1 Time period C-D AU-5, AU-35-V-1 AU-35-V-2, AU-44 RM-4, RB-3 Time period D-E AU-11, AU-13, AU-21 AU-26, AU-45 Time period E-F AU-41, HD-3 HD-5, RB-5 Time period F-G AU-8, AU-12, AU-15 AU-16, AU-18, RM-3 RM-10 Block A-1	Time period E-F AU-43 HD-7 Time period F-G AU-24 Block B-1	Time period E-F AU-10 Time period F-G AU-14 AU-17 AU-23 Block C-1	Time period B-C HD-9 Time period E-F AU-4, AU-29 AU-36, AU-37 AU-42 Time period F-G AU-32 Block D-1
		30	60	90

Distance in feet from stream to site

Those with B–C time periods, plotting with great distances from the streams, fall into two major categories—rock shelters and burial mounds. The location of a rock shelter has nothing to do with streams but rather the availability of the shelter; and burial mounds have no direct correlation with the presence or absence of satisfactory conditions for the agricultural fields or the habitation sites. Thus the locations of sites BA–1, AU–27, RB–7, and HD–9 in table 5 cannot be of any significance to the problem at hand.

Turning to the sites of time period D–E, or those at the beginning of the ceramic sequence in this part of Virginia, they all appear in block A–1, or less than 30 feet from a stream and on a bank not over 10 feet above the stream bed with the exception of two sites, AU–31 and AU–46. With reference to the exceptions, AU-31 and AU–46 are on bluffs overlooking the river. Since these groupings are the sites with the earliest history of agriculture in this part of Virginia, it is not unusual to find them coming close to the river's edge and seeking out the good bottomlands and low terraces for their crops. In other words, the position of the sites definitely correlates with what one would expect of an agricultural group, and this type of plotting helps substantiate the general validity of the seriation and site groupings into ceramic and preceramic time periods based upon other data. The cultural pattern of agriculture caused these peoples to seek a geographic situation most commensurate with their needs. Therefore, one would expect the majority of the sites of this cultural horizon to fall into a specific geographical distribution most beneficial to successful aboriginal agriculture; i. e., in the low bottomlands where the soil is richer and where the land holds the moisture longer.

Turning to the "chert-using" preceramic sites or those found in time period E–F and the "quartzite-using" preceramic sites restricted to time period F–G, we note a more scattered arrangement over table 5. Either this means these peoples were not forced by their pattern of life to live in a specific geographic situation as were the agriculturists, or the terrain has changed so much since their occupation that one can postulate a considerable age for some of the sites by a study of terraces and stream erosion. Unfortunately such geomorphological studies have not been made in Virginia although recently certain members of the United States Geological Survey were examining the possibility of dating some Middle River terraces from archeological information.

Further examination of table 5 indicates that four sites (25.0 percent) in the "chert-using" preceramic horizon (time period E–F) are located in block A–1 as opposed to 12 (75.0 percent) sites of the same period located more remotely from the stream banks either in distance or height. Similar circumstances occur in the "quartzite-using" preceramic horizon (time period F–G) with seven (25.7 percent) in block A–1 and 19 (74.3 percent) more removed, either in height above water level or at greater distances. Checking the site numbers of each one occurring outside block A–1 of table 5 and referring to the site descriptions and notes, it is extremely significant that in each case there is some comment about the extensive erosion, the fact that the stream has changed its course or cut more deeply into the terraces. However, erosion alone is by no means the explanation. If this were the case, then all the sites seriating in the bottom of the time sequence, i. e., in the lowest part of time period F–G, should be the farthest removed in distance and/or altitude from the present-day streams. This is not the case. In fact just as many "chert-using" sites as "quartzite-using" sites of the preceramic horizon are found on high terraces even though the seriated sequences suggest that the "quartzite-using" stations are the earliest in the sequence. The weight of evidence, therefore, suggests that, although erosion might be a factor which will some day prove significant in working out relative time of an occupation of certain aboriginal sites in Virginia, the geomorphology of the region must be more thoroughly analyzed by competent geologists than it has been up to the present time. Under these circumstances the location of various preceramic sites suggests that their type of subsistence pattern did not regulate the location of their habitations as strongly as when the Indians became agriculturists; hence the early habitation sites merely needed to be near a good hunting ground, or a point offering some satisfactory camping conditions and an available water supply.

The results of this experimental study on aboriginal habitation patterns in northwestern Virginia have not been overwhelmingly successful, yet they have not been so unfruitful as to suggest total abandonment of such an approach for future students of Virginia archeology. Perhaps if the data were always carefully observed for each site in the State, more fundamental conclusions could be drawn than is now possible with the limited data at hand.

In summary, sites of the agricultural period tend to be restricted to bottomlands and lowest terraces nearest present-day courses of streams. Preceramic sites tend to be farther away and higher from streams, suggesting a possible time factor, with their present positions resulting from erosion, but also apparently suggesting the lack of any controlling factor in their cultural pattern which would restrict their villages to any particular location, except from the standpoint of a good water supply, defense, hunting and fishing grounds, and water routes.

RELATIONSHIP OF THE SEQUENCES OF NORTHWEST VIRGINIA TO ARCHEOLOGY OF EASTERN UNITED STATES

In summarizing the total results of the individual and combined sequences obtained by this study, it is necessary to compare them with other scientific studies in Virginia and surrounding areas. Although the literature is quite extensive for eastern archeology as a whole, the number of reports dealing with archeological materials in Virginia or adjacent regions which seemed pertinent to this detailed study is actually very limited. It must be emphasized that conclusions drawn from the various approaches herein attempted are not necessarily applicable to other regions although it is felt that the methodology might offer fruitful approaches to research problems of similar situations in eastern North America. Indeed, it seems almost outside of the scope of this paper to do anything more than to show how this intense study of one small area fits into Virginia archeology. Certainly the particular position of one type of point, sherd, or rock material here does not argue for an identical position in any other part of the Eastern United States. Until further work along similar lines is carried out in Virginia and the surrounding States it will be impossible to check the validity of some of the conclusions.

In the preceding section and on various charts the sequences have been arbitrarily broken and marked with letters of the alphabet for convenience in designating time periods. Up to this section the various reasons for the particular points of demarcation have not been clearly delineated. This will be accomplished in subsequent paragraphs but it should be understood that when time periods D–E or B–C, or any other period set off by arbitrary time markers A through G is used, these markers are not to be considered the main point of the discussion. One should, instead, view these designations as mere tools to show various aspects in the development of aboriginal cultures in northwest Virginia.

The following discussion is arranged by the various divisions or markers of time periods, beginning with the earliest determined in the survey area and coming upward in time toward the historic.

Time Marker G (*beginning of Early Archaic*).—This marker has been ordered at the earliest occupation of the area by preceramic cultures as found by this study. It is definitely not to be construed as meaning that this is the point of earliest evidence of man in northwest Virginia. It is firmly believed that one more subdivision remains to be made and that will depend upon how much evidence of Paleo-Indian materials turns up in the future. To date, two eastern-type Folsom points have been reported from the vicinity of RM–1 (Mc-

Cary, 1949, points No. 156, 157). Other such points have been reported northward in the drainage of the South Fork of the Shenandoah River. Therefore, there is reasonable expectation that someday an eastern version of the Paleo-Indian horizon will be clearly defined for this area.

Time Marker F (Early Archaic).—This point on the time scale has been chosen to mark the transition between two clearly defined preceramic horizons. The earlier, called "quartzite-using," extends over the period located between Time Markers G–F and was so designated because of the decided preference for quartzite (over 63 percent) as the rock material for chipped-stone artifacts. In northwest Virginia this horizon is uniquely limited to a narrow band of land at the western foot of the Blue Ridge Mountains along two South Rivers and the South Fork of the Shenandoah River.

Inspection of the projectile-point and blade-seriated sequence (figs. 4 and 5) indicates a preference for large blades in this period. There is a gradual decline in their popularity from the lowest part of this section of the sequence to Time Marker F, and, at the same time, a slight increase in popularity of projectile points occurs. Triangular points of any type are not typical of this horizon. Two projectile point forms, Notched Stemmed Type I and Side-notched Type M, show an increase in percentage occurrence from Time Markers G to F. At the same time these two forms increase (but never appear in large percentages, usually only 4 to 14 percent), large blade Type Q (Large Parallel-sided Stemmed) is increasing from 1 to 13 percent and blade Type U (Large Rounded Base) is decreasing from 28.7 to 5.9 percent.

From the study of the miscellaneous stone artifacts, the crude ax, the hafted end scraper, and the end scraper are more common in this part of the sequence than at later times.

Three-quarters of the sites of this time period were found either at remote distances or on high elevations from present courses of streams. This might be the result of their earlier age, with the stream changing its course or eroding more deeply, but the controlling factor could also be the lack of a need for settlement in the bottomlands since these people were not practicing agriculture.

A study of the literature suggests that sites that fall between Time Markers G–F in this study are manifestations of the Early Archaic as defined by Griffin (1952, pp. 354–355) even though it is realized that many of the cultural traits in Griffin's classification are not available for comparison.

Time Marker E (transition point between Late Archaic and Early Woodland).—It is traditional in the literature on North American archeology to designate the point between the preceramic and ceramic horizons, thus Time Marker E has been so positioned. Throughout the study it has been noted, however, that the complete preceramic horizon has two distinct traditions. The seriational studies indicated that sites showing a high popularity of chert belonged in the more recent (upper) part of the preceramic zone. These sites fall between Time Markers E and F in the seriated sequences (fig. 9). In this period there are distinct changes in the projectile-point types and percentages of occurrence. Notched Stemmed Type I, Side-notched Type M, and Large Parallel-sided Stemmed Type Q decrease from 14.8 to 5.6 percent, 13.8 to 5.6 percent, and 13.0 to 3.7 percent, respectively. At the same time Triangular Type C increases in popularity from 2 to 11 percent (fig. 5).

The geographic distribution of sites falling between Time Markers F and E is west of the so-called "South Rivers District," and therefore west of the Early Archaic sites.

Since Triangular Point Type C appears for the first time in any consistent large percentages, the sites with this type of point were plotted on a map. The distribution is interesting for, in general, those sites with the lowest percentages are distributed more southwesterly than sites with higher percentages. Unfortunately for this type of plotting, the number of sites was not sufficiently large to make definite trends on the map, but it was suggestive that Triangular Type C first came from outside the survey area into northwestern Virginia from the southwest.

It is extremely difficult to relate this horizon to another in Virginia, or nearby regions for that matter, owing to the scant amount of data from areas immediately outside the limits of the survey area. In Albemarle County where a single preceramic horizon has been recognized (Holland, 1949), quartz is the preferred rock material, and triangular forms never have a greater popularity than 5 percent; also other forms, such as projectile-point Types J and K, are more popular than they are in this time period of the survey area. Little purpose is served by comparisons with the published accounts of preceramic horizons of the Savannah River Focus in North Carolina (Coe, 1952, p. 305), the Red Valley Component in New Jersey (Cross, 1941, p. 168), or the Poplar Island Component in Pennsylvania (Witthoft, 1947, pp. 123–124), since they are not described in the same manner as this study and, unfortunately, the data is not convertible for such comparison. However, it is the writer's impression after careful study of these reports that little direct relationship exists between the preceramic "chert-using" horizon of Time Period F–E and the preceramic horizon in the aforementioned reports.

Time Marker D (beginning of Middle Woodland).—Sites of the survey area within the pottery period start the pottery sequence at

Time Marker E. From this point upward in time to the place designated as Time Marker D the pottery is more typical of the ceramic traditions of the Central and North Central Ceramic Area of Virginia than those types which later typify the Allegheny Ceramic Area (cf. Evans, 1955, p. 103). These trends, in both the survey area and in the Central and North Central Ceramic Area, may be summarized as follows: The earliest sites have a high percentage of the Stony Creek Pottery Series, moderate percentages of the Albemarle Pottery Series, and traces of the Marcey Creek Pottery Series; throughout the passage of time (upward in the sequence) the Stony Creek Pottery Series declines in frequency while the Albemarle Pottery Series increases and there is an early loss of the Marcey Creek Pottery Series (fig. 8).

All the sites in the survey area with sherds of Stony Creek or Marcey Creek Pottery Series were plotted on a map (fig. 11) according to their percentage occurrence in four categories: Sites with 3–10 percent, 13–22 percent, and 35–60 percent pottery of the Stony Creek Series, and the presence or absence of sherds of the Marcey Creek Pottery Series, regardless of amount. The various points of breakdown in the percentage occurrences are purely arbitrary but represent the most distinct breaks, e. g., no sites existed with a percentage frequency of sherds of the Stony Creek Pottery Series from 22–35 percent, hence this point was considered as a breaking point of two categories. Although a very small number of sites are involved, the results are nevertheless significant. Sites with sherds of the Marcey Creek Pottery Series are found only along the western foot of the Blue Ridge Mountains, and in the same locale are sites with the highest percentages (35–50 percent) of sherds of the Stony Creek Pottery Series. As one moves westward, away from the Blue Ridge Mountains, Marcey Creek Pottery disappears entirely and the frequency of Stony Creek Pottery falls so that the most distant sites have only 3–10 percent (fig. 11). This distribution suggests that these pottery types, which are most typical of the Central and North Central Ceramic Area of Virginia, enter the survey area as far as the central part of the Middle River valley with direction of movement decidedly from the southeast and east. No influence can be demonstrated to have come from the north or west in Time Period E–D.

At the same time that the pottery has shown such distinct trends and directions of movement, the chipped-stone artifacts also show marked trends. With the passage of time triangular points become more popular while various stemmed varieties continue to decline in frequency, i. e., Medium Triangular Type B increases from 0.6 percent (AU–13) to 7.1 percent (AU–5) and Triangular Type C from 8.7 percent (AU–13) to 19.5 percent (AU–5). Of a total of five sites in the entire study with Pentagonal Point Type E, four of them are above Time Marker E. The same relative position of Type E, as well as the trends of popularity of the various point and blade types for the survey area, also occurred in the study of sites in Virginia as a whole (see Holland, 1955, p. 175 and fig. 23).

With the introduction of pottery, other artifact types changed: Drills, celt forms, and pipes became more frequent; steatite bowls were popular on the earliest sites in the ceramic sequence; scrapers and crude axes declined in frequency.

The majority of the sites were near the streams in the bottomlands instead of more distant from the water, a point undoubtedly associated with the need for location of habitations in areas more favorable to agriculture.

Although it is suggested that sites AU–11, AU–13, and AU–26 have characteristics of the Early Woodland Period and are found at the earlier part of the Time Period E–D, the real problem is the point of demarcation between the Early Woodland and Middle Woodland Periods. Evans (1955, chart 1) delineates the Middle Woodland as the period in the Central and North Central Ceramic Area in which there is an increase in the Albemarle Pottery Series and a decline in the Stony Creek Pottery Series. Although this process is taking place at the three aforementioned sites, it seems more likely that Middle Woodland in the survey area begins with the steadily increasing popularity of the Radford Pottery Series, and either Evans' designation is too generalized a statement and slightly in error, or there is a local factor to be considered which would make the period designations slightly different for each area. It is felt that the ceramic sites in the sequence for the survey area nearest the Time Marker E would be Early Woodland and that Time Marker D is about the beginning of the Middle Woodland Period.

Time Marker C (Middle-Late Woodland).—The point in the seriated sequences of sites where the Radford Pottery Series reached its maximum popularity was arbitrarily designated as Time Marker C, and means that the Time Period D–C probably represents Middle-Late Woodland Period development. As the sites with pottery of the Stony Creek and Albemarle Pottery Series gave way to sites with the increasing popularity of the limestone-tempered Radford Pottery Series, it was obvious that this reflects a new cultural movement into northwestern Virginia. To see if it might be possible to discover the direction of influence carrying the Radford Pottery Series tradition of limestone-tempered wares, all those sites with such pottery were plotted on a map (fig. 12) and given a symbol according to whether they had 1–10 percent, 27–40 percent, or 95–100 percent Radford Pottery Series as derived from the percentage calculations found in the Appendix, table 7. Inspection of figure 12 indicates clearly that the movement is from the southwest to the northeast with those sites having the lowest percentage in the most extreme northeast position, whereas those sites with the highest percentage are to the southwest. This immediately suggests that the cultural influence, whether by diffusion or from the actual movements of a group, came from this direction. These data rather interestingly confirm Evans' (1955, pp. 127–129) comments and propositions that the Radford Pottery Series in high percentage occurrences antedates the New River Series and the movement of both these pottery traditions into the Allegheny region of Virginia is probably from the southwest, in West Virginia or adjacent regions.

Only mounds RB–7 (Battle or Bell Mound No. 1) and HD–9 (Clover Creek Mound) can be related to this time horizon on the basis of pottery content. The burial pattern of a flexed position with the bodies covered by stones, the occurrence of similar grave goods, the presence of a mound built on a broad, level bottomland near a stream, are quite similar in the various mounds of AU–35–M, HD–9, RB–7, and RB–2, suggesting that they all must belong to the same cultural complex. The published data or museum collections do not permit accurate comparison, but all the mounds excavated by Fowke (1894) in Virginia do not fall necessarily into this time period of the mounds in northwest Virginia.

Time Marker B (Protohistoric).—This point marks the period in the sequence where the New River Pottery Series reaches its maximum popularity. Although this is not clearly defined by the sites in the area, Evans' study for the whole of Virginia defines the pottery development for the Allegheny Area in such a way there is little doubt that the change from Radford Pottery to the New River Pottery, with its subsequent increase in popularity, occurs at a time somewhere around the extreme Late Woodland or Protohistoric. The single site, AU–2, having 64 percent New River Series and 2 percent Radford Series with 34 percent unclassified sand-tempered pottery of a type definitely not of the Stony Creek Pottery Series, draws attention to the Southern Division of the Allegheny Ceramic Area where the transition through time from the limestone-tempered Radford Pottery Series to the shell-tempered New River Pottery Series has been fully worked out (Evans, 1955, pp. 103–108). The pottery of AU–2 may also be compared to the Keyser Farm material where, of the body sherds classified according to temper, 78 percent of the sherds were shell tempered (Keyser Cord Marked; considered a subtype of the New River Pottery Series by Evans), 3.9 percent limestone tempered (Page Cord Marked; considered to be a subtype of the Radford Pottery Series by Evans) and 18.1 percent were "grit" tempered (Potomac Creek). A detailed discussion of this subject can be found in the original sources (Manson, MacCord, and Griffin, 1944, pp. 402–407; Evans, 1955, pp. 60, 67). The relative percentages of temper in the three wares from each site are sufficiently close to make it believable that AU–2 and the Keyser Farm Site are closely related in time. Further, Schmitt (1952, p. 62) relates the Keyser Farm Site with various foci, such as Gala, Potomac Creek, etc., to the Late Woodland Period. Griffin (op. cit., p. 413) dates the site between 1550 and 1650, and Evans (op. cit., p. 145) sees a high percentage of New River Series Pottery belonging to a Woodland-Fort Ancient mixture in the Late Woodland Period in Virginia. On the basis of these conclusions without contradictory evidence from the current study, it is felt that Time Marker B designates the Protohistoric horizon.

Time Marker A (Historic).—The historic era begins in Virginia with the English colonists in the tidewater area in 1607 even though some sources report a Spanish Mission was thought to have been established earlier on the Rappahannock River. To date, there has been no proof of this non-English settlement in Virginia. In the Shenandoah Valley the exact date of the introduction of European trade goods has not as yet been established archeologically. In nearby West Virginia, recently, MacCord (1952) has given convincing evidence of Susquehannock occupation between A. D. 1630 and 1677 at the Herriot Site on the south branch of the Potomac in Hampshire County, W. Va. The major pottery types from this site have been related to the Susquehannock during the Historic period by Witthoft (1947, pp. 249–253) and the minority pottery type resembles Keyser Cord Marked from the Keyser Farm Site (Manson, MacCord, and Griffin, 1944, pp. 402–405).

Unfortunately, no sites in the survey area had any sort of trade goods that could be dated historically, so the upper part of the sequence must be left partially suspended and without a specific date of any sort. Based upon the data of this study we must assume that either the Indians were not living in the area covered by this survey during historic times, or for some reason the survey techniques failed to uncover late sites. With reference to the general picture of aboriginal Virginia, the first postulate does not seem likely even though the region might have been so sparsely settled that no large deposits were left. This part of the sequence is therefore left for future study to verify.

An examination of this chronological sequence in geographical terms reveals a peculiar situation: the "quartzite-using" and "chert-using" preceramic sites have nonoverlapping distributions both in time and in space. The number of sites representing each area is sufficiently large that sampling error does not seem a likely explanation, which leads to the implication that the area producing "quartzite-using" sites was uninhabited in "chert-using" times, and vice versa. Since there are no natural barriers or other geographical reasons for believing this to be true, it is reasonable to assume that both areas were occupied at the same time and that the two cultures are in large part contemporary in the area. If this is the case, it would seem to invalidate seriation as a method of determining relative age of sites and cultures. Seriation has been shown to give reliable results so often, however, that some particular situation existing in the area under study must be sought to reconcile these discrepancies.

One explanation that presents itself is that the archaic projectile-point forms that place the "quartzite-using" cultures early in the sequence may represent a cultural lag which allowed these types to be retained after they had been superseded in other parts of the Eastern United States. The evidence concerning the origin of the two preceramic cultures suggests that this is a reasonable interpretation. Since the "chert-using" ceramic culture can be shown to have moved in from the west, it is probable that the "chert-using" preceramic groups came from the same direction. Likewise, the fact that the "quartzite-using" ceramic culture has affiliations with the east suggests that the same may be true of the "quartzite-using" preceramic horizon. Evans (1955, pp. 128–129) has shown that whereas a number of relationships between the Allegheny Area of Virginia and West Virginia, Kentucky, Ohio, and Pennsylvania can be discerned, there were fewer influences on the part of the State lying east of the Alleghenies, and these were primarily from the north and south.

The relative isolation of eastern Virginia might have allowed the retention of older projectile-point forms while the Allegheny Area was being kept up to date by contacts with more active centers of cultural innovation to the west.

Further evidence in support of general contemporaneity of these two preceramic cultures comes from the analysis of geographical location. When the sites were tabulated according to distance from the river, it was found that about the same number of "chert-using" as "quartzite-using" preceramic sites were distant from the present water channels and about the same number of both were close. This suggested that there was no appreciable difference in the antiquity of the two cultures (pp. 78–79).

If this is a correct analysis of the problem, it provides additional justification for the approach outlined in this paper. If the projectile-point seriation had not been combined with rock-material analysis and geographical distribution, the interesting suggestion that two typologically different groups were contemporaneous in this part of Virginia would have been overlooked. The possibility that this may be so provides leads for further research in the adjacent regions, in addition to showing with reasonable certainty an example of cultural lag on the archeological level.

This study of 82 sites in a restricted area of northwest Virginia shows a continuous typological sequence of the region from Early Archaic to Protohistoric times. If the analysis had been undertaken with only one group of artifact types, such as pottery or projectile points or blades, or axes, etc., the broad scope of interpretation achieved for northwest Virginia could not have been made. It was discovered in the early days of the survey that varying conditions for collecting limited the types and amounts of artifact materials that could be obtained from many of the sites. Therefore, the use of chip materials was attempted. This heretofore untried technique in Eastern archeology proved extremely profitable and not only made it possible to utilize many sites otherwise unusable because of a lack of sufficient specimens, but permitted the correlation of rock materials from chips with those of the projectile points and large blades. Certain interesting conclusions relating to both the materials available and the importance of culture as a determining factor in the choice of rock material resulted from this analysis. If future work in Virginia, as well as nearby areas, would incorporate a similar analysis of rock materials and chip collections, undoubtedly results of greater significance could be obtained than is now possible with only a single such study of this type.

Another experimental approach was the analysis of the physical position of the sites as related to local geographical features. This problem needs much further exploration in other areas in Virginia or nearby States before conclusions can be stated positively. The correlation of the sites of ceramic-using cultures with bottomlands and those of nonceramic-using cultures with terraces more distant from the stream may be explained by cultural determinants, or by a possible factor of geological age and stream erosion. This approach emphasizes the need for cooperation between the geologist and archeologist in the study of aboriginal occupation of the Appalachian Valley of Virginia.

APPENDIX

TABLES OF PROJECTILE-POINT AND BLADE TYPES, ROCK MATERIAL, CHIPS, AND OTHER ARTIFACTS, AND POTTERY CLASSIFICATIONS

Table 6.—*Occurrence, by sites, of projectile-point and blade types, rock material, chips, and other artifacts*

Projectile-point and blade types, chips, other artifacts, and potsherds	AU-1						AU-2						AU-3						AU-3A						AU-4					
	Chert	Quartz	Quartzite	Greenstone	Total	Percentage	Chert	Quartz	Quartzite	Greenstone	Total	Percentage	Chert	Quartz	Quartzite	Greenstone	Total	Percentage	Chert	Quartz	Quartzite	Greenstone	Total	Percentage	Chert	Quartz	Quartzite	Greenstone	Total	Percentage
Projectile-point types:																														
A							2				2	20.0																		
B																									3				3	2.1
C																									13		1		14	9.5
D																									21				21	14.3
E																														
F		1	1		2	6.5							1				1										1		1	.7
G																														
H																									2		1		3	2.1
I	2				2	6.5							1				1								11	1	2		14	9.5
J			1		1	3.2			1		1	10.0													4				4	2.7
K			1		1	3.2																					2		2	1.4
L	1		3		4	13.0	1		1		2	20.0													5		3		8	5.4
M	2	1	2		5	16.0																			6				6	4.1
N	1	1	2		4	13.0	4				4	40.0													25	1	4		30	20.4
O							1				1	10.0																		
Large-blade types:																														
P			1		1	3.2																			1		1		2	1.4
Q			2		2	6.5																			1				1	.7
R	1				1	3.2																								
S			1		1	3.2																								
T																														
U	1		4		5	16.0																			9		3		12	8.2
V			2		2	6.5																			16		10		26	17.5
Total	8	3	20		31	100.0	8		2		10	100.0	2				2								117	2	28		147	
Percentage	26.0	9.7	64.3			100.0	80.0		20.0			100.0													79.6	1.3	19.1			100.0
Chips:																														
Collection A							44	3	5		52								63		16	10	89		213		21		234	
Percentage							84.5	5.8	9.6			100.0							71.0		17.7	11.3		100.0	91.0		9.0			100.0
Collection B																									210	3	15	6	234	
Percentage																									90.0	1.2	6.4	2.4		100.0

Other artifacts:																														
Ax: Crude	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Celt: Crude	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	1	1	----
Celt: Pecked, polished	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	1	1	----
End scraper (hafted)	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
End scraper	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Side scraper	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Graver	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Drill	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	2	----	----	----	2	----
Mano	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Hammer-anvil stone	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Pipe: Chlorite	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Pipe: Clay	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Soapstone vessel fragments	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Quartz crystal	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Pendant	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Potsherds	----	----	----	----	----	----	----	----	----	----	47	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----

TABLE 6.—*Occurrence, by sites, of projectile-point and blade types, rock material, chips, and other artifacts*—Continued

Projectile-point and blade types, chips, other artifacts, and potsherds	AU-5						AU-7						AU-8						AU-9						AU-10					
	Chert	Quartz	Quartzite	Greenstone	Total	Percentage	Chert	Quartz	Quartzite	Greenstone	Total	Percentage	Chert	Quartz	Quartzite	Greenstone	Total	Percentage	Chert	Quartz	Quartzite	Greenstone	Total	Percentage	Chert	Quartz	Quartzite	Greenstone	Total	Percentage
Projectile-point types:																														
A																														
B	5	3			8	7.1																			3				3	
C	20	2			22	19.5					2																			
D	17		3		20	17.6									1		1													
E	3				3	2.7																								
F	1	1			2	1.8															1		1	1.8						
G																														
H	3				3	2.7															2		2	3.9						
I	1	2			3	2.7														2	2		4	8.0						
J	2		1		3	2.7															2		2	3.9						
K	1		1		2	1.8													1	1	1	1	4	8.0						
L	4		2		6	5.3					6								1		2		3	5.9			1		1	
M	3				3	2.7															2		2	3.9						
N	25		3		28	24.5													3		5		8	15.7						
O											2																			
Large blade types:																														
P			2		2	1.8															3		3	5.9						
Q																					1		1	1.8			1		1	
R			1		1	.9																								
S																														
T																														
U	1		2		3	2.7															10		10	19.6						
V			4		4	3.5														1	10		11	21.6						
Total	86	8	19		113	100.0					10				1		1		5	4	41	1	51	100.0	3		2		5	
Percentage	76.0	7.2	16.8			100.0													9.8	8.0	80.2	2.0		100.0						
Chips:																														
Collection A	291	11	7		309								2		47		49		11	20	143	4	178		37		11		48	
Percentage	94.2	3.5	2.3			100.0							4.0		96.0			100.0	6.0	11.0	81.0	2.0		100.0	77.0		23.0			100.0
Collection B																														
Percentage																														

Other artifacts:																														
Ax: Crude																														
Celt: Crude																1	1													
Celt: Pecked, polished				2	2						1																			
End scraper (hafted)																														
End scraper	3				3																									
Side scraper	1				1																									
Graver																														
Drill	2				2																									
Mano																														
Hammer-anvil stone																														
Pipe: Chlorite																														
Pipe: Clay																														
Soapstone vessel fragments					2																									
Quartz crystal																														
Pendant																														
Potsherds					86						12																			

TABLE 6.—*Occurrence, by sites, of projectile-point and blade types, rock material, chips, and other artifacts*—Continued

Projectile-point and blade types, chips, other artifacts, and potsherds	AU-11						AU-12						AU-13						AU-14						AU-15					
	Chert	Quartz	Quartzite	Greenstone	Total	Percentage	Chert	Quartz	Quartzite	Greenstone	Total	Percentage	Chert	Quartz	Quartzite	Greenstone	Total	Percentage	Chert	Quartz	Quartzite	Greenstone	Total	Percentage	Chert	Quartz	Quartzite	Greenstone	Total	Percentage
Projectile-point types:																														
A	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
B	1	2	1	----	4	1.9	2	----	----	----	2	13.3	1	----	----	----	1	0.6	----	----	----	----	----	----	----	----	----	----	----	----
C	8	12	11	----	31	14.4	----	----	----	----	----	----	5	1	8	----	14	8.7	----	----	----	----	----	----	----	----	----	----	----	----
D	5	3	8	----	16	7.4	1	----	----	----	1	6.7	7	1	5	----	13	8.1	1	----	----	----	1	7.3	----	----	----	----	----	----
E	2	----	2	----	4	1.9	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
F	2	3	10	----	15	7.0	----	----	1	----	1	6.7	----	----	2	----	2	1.2	----	----	----	----	----	----	----	----	----	----	----	----
G	----	1	----	----	1	0.5	----	----	----	----	----	----	----	1	----	----	1	0.6	----	----	----	----	----	----	----	----	----	----	----	----
H	3	1	1	----	5	2.3	----	----	----	----	----	----	----	1	3	----	4	2.5	----	----	----	----	----	----	----	----	----	----	----	----
I	----	2	1	----	3	1.4	----	1	----	----	1	6.7	2	2	5	----	9	5.6	----	----	----	----	----	----	----	----	----	----	----	----
J	4	3	4	----	11	5.1	----	----	----	----	----	----	4	2	4	----	10	6.2	----	----	----	----	----	----	----	----	1	----	1	6.3
K	----	4	1	----	5	2.3	----	----	----	----	----	----	----	3	1	----	4	2.5	----	----	----	----	----	----	----	----	----	----	----	----
L	3	2	13	----	18	8.3	1	----	----	----	1	6.7	5	3	15	----	23	14.3	----	----	----	----	----	----	----	1	1	----	2	12.3
M	2	----	2	----	4	1.9	----	1	----	----	1	6.7	2	3	4	----	9	5.6	----	----	----	----	----	----	----	----	----	----	----	----
N	13	8	21	----	42	19.4	3	----	----	----	3	20.0	2	3	6	----	11	6.7	----	2	----	----	2	14.4	----	2	----	----	2	12.3
O	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Large blade types:																														
P	----	----	----	----	----	----	----	----	----	----	----	----	----	----	4	----	4	2.5	----	----	----	----	----	----	----	----	----	----	----	----
Q	----	----	8	----	8	3.6	----	----	----	----	----	----	----	----	6	----	6	3.7	----	----	1	----	1	7.3	----	----	----	----	----	----
R	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
S	----	----	2	----	2	0.9	----	----	----	----	----	----	----	----	----	----	----	----	----	----	1	----	1	7.3	----	----	----	----	----	----
T	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
U	1	1	13	----	15	7.0	----	----	1	----	1	6.7	1	----	13	----	14	8.7	----	----	1	----	1	7.3	----	----	5	----	5	31.4
V	----	1	31	----	32	14.7	----	----	4	----	4	26.5	7	3	26	----	36	22.5	----	----	8	----	8	56.4	2	----	4	----	6	37.7
Total	44	43	129	----	216	100.0	7	2	6	----	15	100.0	36	23	102	----	161	100.0	1	2	11	----	14	100.0	2	3	11	----	16	100.0
Percentage	20.0	20.0	60.0	----	----	100.0	46.6	13.4	40.0	----	----	100.0	23.7	14.3	62.0	----	----	100.0	7.3	14.4	79.3	----	----	100.0	12.3	18.7	69.0	----	----	100.0
Chips:																														
Collection A	38	39	55	4	136	----	47	4	170	----	221	----	55	34	189	3	281	----	22	5	96	11	134	----	----	----	----	----	----	----
Percentage	28.0	29.0	40.0	3.0	----	100.0	21.2	1.8	77.0	----	----	100.0	19.6	12.1	67.0	1.3	----	100.0	16.5	3.7	71.6	8.2	----	100.0	----	----	----	----	----	----
Collection B	29	28	81	----	138	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Percentage	21.0	20.4	58.6	----	----	100.0	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----

Other artifacts:																														
Ax: Crude			1	1	2																1	1								
Celt: Crude				12	12											5	5				3	3								
Celt: Pecked, polished				4	4																									
End scraper (hafted)																														
End scraper													1	1	1		3										1		1	
Side scraper																														
Graver															1		1													
Drill	2		2		4										1		1													
Mano																														
Hammer-anvil stone																														
Pipe: Chlorite																														
Pipe: Clay																	2													
Soapstone vessel fragments					2												9													
Quartz crystal					1												1													
Pendant																														
Potsherds					45						1						34													

TABLE 6.—*Occurrence, by sites, of projectile-point and blade types, rock material, chips, and other artifacts*—Continued

Projectile-point and blade types, chips, other artifacts, and potsherds.	AU-16						AU-17						AU-18						AU-21						AU-22					
	Chert	Quartz	Quartzite	Greenstone	Total	Percentage	Chert	Quartz	Quartzite	Greenstone	Total	Percentage	Chert	Quartz	Quartzite	Greenstone	Total	Percentage	Chert	Quartz	Quartzite	Greenstone	Total	Percentage	Chert	Quartz	Quartzite	Greenstone	Total	Percentage
Projectile-point types:																														
A	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
B	----	----	----	----	----	----	1	----	----	----	1	1.6	----	----	----	----	----	----	----	1	----	----	1	3.8	----	----	----	----	----	----
C	----	----	1	----	1	1.8	----	----	----	----	----	----	1	----	----	----	1	2.7	5	1	----	----	6	23.0	1	----	----	----	1	----
D	1	----	----	----	1	1.8	----	----	----	----	----	----	1	----	1	----	2	5.4	8	----	----	----	8	31.0	----	----	----	----	----	----
E	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
F	----	----	1	----	1	1.8	----	----	1	----	1	1.6	1	----	1	----	2	5.4	----	----	----	----	----	----	----	----	----	----	----	----
G	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
H	----	----	2	----	2	3.7	----	1	1	----	2	3.2	1	----	----	----	1	2.7	----	----	----	----	----	----	----	----	----	----	----	----
I	1	----	1	----	2	3.7	1	2	2	----	5	8.0	----	----	7	----	7	18.9	----	----	1	----	1	3.8	----	----	1	----	1	----
J	----	----	1	----	1	1.8	----	----	1	----	1	1.6	2	----	----	----	2	5.4	----	----	----	----	----	----	----	----	----	----	----	----
K	----	----	----	----	----	----	2	1	1	----	4	6.4	----	1	----	----	1	2.7	----	----	----	----	----	----	----	----	1	----	1	----
L	----	2	4	1	7	13.0	----	3	5	----	8	13.0	----	----	5	----	5	13.5	----	----	----	----	----	----	----	----	2	----	2	----
M	2	2	2	----	6	11.2	1	4	3	----	8	13.0	2	2	1	----	5	13.5	----	----	----	----	----	----	----	----	----	----	----	----
N	3	----	2	----	5	9.4	----	4	4	----	8	13.0	1	1	----	----	2	5.4	3	3	----	----	6	23.0	----	----	----	----	----	----
O	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Large blade types:																														
P	----	----	----	----	----	----	----	----	----	----	----	----	----	----	2	----	2	5.4	----	----	----	----	----	----	----	----	1	----	1	----
Q	----	----	7	----	7	13.0	----	2	----	----	2	3.2	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
R	----	----	1	----	1	1.8	----	----	----	----	----	----	----	----	----	----	----	----	----	----	1	----	1	3.8	----	----	----	----	----	----
S	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
T	----	----	----	----	----	----	----	----	----	----	----	----	1	----	2	----	3	8.1	----	----	----	----	----	----	----	----	----	----	----	----
U	1	2	10	----	13	24.0	----	----	8	1	9	14.4	----	----	3	----	3	8.1	----	----	----	----	----	----	----	----	----	----	----	----
V	1	----	6	----	7	13.0	----	----	13	----	13	21.0	----	----	1	----	1	2.7	----	1	2	----	3	11.6	----	----	----	----	----	----
Total	9	6	38	1	54	100.0	5	17	39	1	62	100.0	10	4	23	----	37	100.0	16	6	4	----	26	100.0	1	----	5	----	6	----
Percentage	16.7	11.2	70.3	1.8	----	100.0	8.0	27.4	63.0	1.6	----	100.0	27.0	10.8	62.2	----	----	100.0	61.8	23.0	15.2	----	----	100.0	----	----	----	----	----	----
Chips:																														
Collection A	11	16	117	----	144	----	6	35	201	3	245	----	----	----	----	----	----	----	99	6	43	5	153	----	----	----	----	----	----	----
Percentage	7.7	11.0	81.3	----	----	100.0	2.7	14.0	82.0	1.3	----	100.0	----	----	----	----	----	----	65.0	3.8	28.0	3.2	----	100.0	----	----	----	----	----	----
Collection B	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Percentage	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----

Other artifacts:																														
Ax: Crude																3	3					1	1							
Celt: Crude																4	4					1	1							
Celt: Pecked, polished																2	2					1	1							
End scraper (hafted)			1		1																									
End scraper										1	1								1				1		1				1	
Side scraper																														
Graver																														
Drill									1		1																			
Mano																														
Hammer-anvil stone																														
Pipe: Chlorite																	1													
Pipe: Clay																														
Soapstone vessel fragments																														
Quartz crystal																														
Pendant																	1											1	1	
Potsherds					1																		90							

TABLE 6.—*Occurrence, by sites, of projectile-point and blade types, rock material, chips, and other artifacts*—Continued

Projectile-point and blade types, chips, other artifacts, and potsherds	AU-23						AU-24						AU-25						AU-26						AU-27					
	Chert	Quartz	Quartzite	Greenstone	Total	Percentage	Chert	Quartz	Quartzite	Greenstone	Total	Percentage	Chert	Quartz	Quartzite	Greenstone	Total	Percentage	Chert	Quartz	Quartzite	Greenstone	Total	Percentage	Chert	Quartz	Quartzite	Greenstone	Total	Percentage
Projectile-point types:																														
A																			1				1	6.2						
B																														
C													1				1	2.0	5		2		7	43.1						
D							1		2		3	2.0	1				1	2.0			1		1	6.2						
E																														
F			3		3	3.5		1	11		12	8.0									1		1	6.2						
G								1			1	0.7																		
H	1		2		3	3.5		1	1		2	1.3							1				1	6.2						
I		1	3		4	4.6	1	2	5		8	5.4		1			1	2.0												
J	1	3	5		9	10.5	1	1	1		3	2.0			2		2	4.0												
K		1			1	1.2	2	2	3		7	4.7																		
L			6		6	7.0	5	4	6	1	16	10.8	1		8		9	18.0	1	1			2	12.6						
M			7		7	8.2	2	4	6		12	8.0		1	2		3	6.0	1	1	1		3	18.9						
N		1	1		2	2.3	2	4	6		12	8.0		1	4		5	10.0							1				1	
O																														
Large blade types:																														
P									6		6	4.0			1		1	2.0												
Q			9		9	10.5		1	6		7	4.7			2		2	4.0												
R																														
S																														
T									1		1	0.7																		
U			16		16	18.5		2	27	2	31	20.8		1	7		8	16.0												
V			24	2	26	30.2	2	1	24	1	28	18.9		2	15		17	34.0												
Total	2	6	76	2	86	100.0	16	24	105	4	149	100.0	3	6	41		50	100.0	9	2	5		16	100.0	1				1	
Percentage	2.3	7.0	88.4	2.3		100.0	10.8	16.2	70.5	2.5		100.0	6.0	12.0	82.0			100.5	56.3	12.5	31.2			100.0						
Chips:																														
Collection A	12	7	130		149		4	17	78	1	100		2	12	105	2	121		111	5	101	2	219		81	2			83	
Percentage	8.1	4.7	87.2			100.0	4.0	17.0	78.0	1.0		100.0	1.6	9.8	87.0	1.6		100.0	51.0	2.2	46.0	0.8		100.0	97.5	2.5				100.0
Collection B																														
Percentage																														

Other artifacts:																														
Ax: Crude										7	7					1	1											1	1	
Celt: Crude				1	1					3	3																			
Celt: Pecked, polished																														
End scraper (hafted)																1	1													
End scraper	1				1										1		1													
Side scraper																														
Graver													1				1													
Drill							1		1		2																			
Mano																														
Hammer-anvil stone																														
Pipe: Chlorite																														
Pipe: Clay																														
Soapstone vessel fragments					1																		3							
Quartz crystal																														
Pendant											1																			
Potsherds					1						12						1						149						8	

TABLE 6.—*Occurrence, by sites, of projectile-point and blade types, rock material, chips, and other artifacts*—Continued

Projectile-point and blade types, chips, other artifacts, and potsherds	AU-29						AU-30						AU-31						AU-32						AU-33					
	Chert	Quartz	Quartzite	Greenstone	Total	Percentage	Chert	Quartz	Quartzite	Greenstone	Total	Percentage	Chert	Quartz	Quartzite	Greenstone	Total	Percentage	Chert	Quartz	Quartzite	Greenstone	Total	Percentage	Chert	Quartz	Quartzite	Greenstone	Total	Percentage
Projectile-point types:																														
A	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
B	---	---	---	---	---	---	---	---	---	---	---	---	5	---	---	---	5	5.2	---	---	---	---	---	---	---	---	---	---	---	---
C	1	---	---	---	1	1.2	---	---	---	---	---	---	22	2	6	---	30	31.3	---	1	---	---	1	10.0	---	---	---	---	---	---
D	---	---	---	---	---	---	---	---	---	---	---	---	12	2	2	---	16	16.7	1	---	1	---	2	20.0	---	---	---	---	---	---
E	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
F	---	---	---	---	---	---	1	---	---	---	1	4.5	---	---	---	---	---	---	---	1	---	---	1	10.0	---	---	1	1	2	4.2
G	---	---	---	---	---	---	---	---	---	---	---	---	1	1	---	---	2	2.1	---	---	---	---	---	---	---	---	---	---	---	---
H	2	---	---	---	2	2.4	2	---	---	---	2	9.1	---	---	1	---	1	1.0	---	---	---	---	---	---	---	---	---	---	---	---
I	8	---	2	---	10	12.0	6	---	---	---	6	27.3	1	---	4	---	5	5.2	---	---	---	---	---	---	---	1	2	---	3	6.2
J	2	1	1	---	4	4.8	---	---	---	---	---	---	---	---	1	---	1	1.0	---	---	1	---	1	10.0	1	1	1	---	3	6.2
K	2	---	2	---	4	4.8	---	2	---	---	2	9.1	1	2	1	---	4	4.2	---	---	1	---	1	10.0	2	1	---	---	3	6.2
L	18	1	8	---	27	32.5	3	1	1	---	5	22.8	2	---	3	---	5	5.2	---	---	---	---	---	---	---	2	3	---	5	10.5
M	6	---	2	---	8	10.2	3	---	---	---	3	13.6	---	---	---	---	---	---	1	---	---	---	1	10.0	---	---	---	---	---	---
N	6	1	6	---	13	15.5	---	---	---	---	---	---	6	2	3	---	11	11.3	1	1	---	---	2	20.0	2	---	5	1	8	16.8
O	1	---	---	---	1	1.2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Large blade types:																														
P	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Q	---	---	11	---	11	13.0	---	---	2	---	2	9.1	---	---	---	---	---	---	---	---	1	---	1	10.0	---	---	4	---	4	8.3
R	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
S	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
T	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
U	---	---	---	---	---	---	---	1	---	---	1	4.5	---	---	2	---	2	2.1	---	---	---	---	---	---	2	1	7	---	10	20.8
V	---	---	2	---	2	2.4	---	---	---	---	---	---	4	---	10	---	14	14.6	---	---	---	---	---	---	---	---	10	---	10	20.8
Total	46	3	34	---	83	100.0	15	3	4	---	22	100.0	51	9	33	---	96	99.9	3	3	4	---	10	100.0	7	6	33	2	48	100.0
Percentage	55.4	3.6	41.0	---	---	100.0	68.2	13.6	18.2	---	---	100.0	53.5	9.4	34.1	---	---	100.0	30.0	30.0	40.0	---	---	100.0	14.6	12.6	68.6	4.2	---	100.0
Chips:																														
Collection A	---	---	---	---	---	---	---	---	---	---	---	---	72	20	24	1	117	---	26	8	64	---	98	---	18	60	138	2	218	---
Percentage	---	---	---	---	---	---	---	---	---	---	---	---	62.0	17.0	20.1	0.9	---	100.0	26.5	8.0	65.5	---	---	100.0	8.2	27.5	63.4	0.9	---	100.0
Collection B	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Percentage	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

Other artifacts:																														
Ax: Crude										1	1																	1	1	
Celt: Crude																4	4													
Celt: Pecked, polished										1	1					16	16					1	1							
End scraper (hafted)																									1				1	
End scraper													1				1								1	2	1		4	
Side scraper																														
Graver																														
Drill													5				5										1		1	
Mano																														
Hammer-anvil stone																											1		1	
Pipe: Chlorite																	1													
Pipe: Clay																														
Soapstone vessel fragments																														
Quartz crystal																														
Pendant																														
Potsherds																	343						1						3	

Table 6.—*Occurrence, by sites, of projectile-point and blade types, rock material, chips, and other artifacts*—Continued

Projectile-point and blade types, chips, other artifacts, and potsherds	AU-34						AU-35-V-1						AU-35-V-2						AU-36						AU-37					
	Chert	Quartz	Quartzite	Greenstone	Total	Percentage	Chert	Quartz	Quartzite	Greenstone	Total	Percentage	Chert	Quartz	Quartzite	Greenstone	Total	Percentage	Chert	Quartz	Quartzite	Greenstone	Total	Percentage	Chert	Quartz	Quartzite	Greenstone	Total	Percentage
Projectile-point types:																														
A													2				2	5.1												
B							1				1	2.3	5				5	12.6												
C							18	2	2		22	50.0	11				11	28.4	10	1			11	10.0						
D							7	1			8	18.2	4				4	10.1	5				5	4.6						
E							1				1	2.3							2				2	1.8						
F																														
G																														
H																			7				7	6.3					1	
I													2				2	5.1	5		1		6	5.5						
J													1		1		2	5.1	3	2			5	4.6					1	
K														1			1	2.6	2	1			3	2.7						
L					1									1			1	2.6	11		1		12	10.9						
M							1				1	2.3							8	1			9	8.2						
N							8		1		9	20.4	10				10	25.8	24		2		26	23.6					1	
O																														
Large blade types:																														
P																					1		1	.9					1	
Q															1		1	2.6			8		8	7.3					2	
R																														
S																														
T																														
U					2																									
V							2				2	4.5							6		9		15	13.7						
Total					3		38	3	3		44	100.0	35	2	2		39	100.0	83	5	22		110	100.0					6	
Percentage							86.4	6.8	6.8			100.0	89.8	5.1	5.1			100.0	75.4	4.6	20.0			100.0						

Chips:																														
Collection A	----	----	----	----	----	----	147	19	6	----	172	----	114	12	5	1	132	----	145	11	10	2	168	----	34	----	----	2	36	----
Percentage	----	----	----	----	----	----	85.5	10.9	3.6	----	----	100.0	86.2	9.2	3.8	0.8	----	100.0	86.4	6.4	6.0	1.2	----	100.0	94.5	----	----	5.5	----	100.0
Collection B	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Percentage	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Other artifacts:																														
Ax: Crude	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Celt: Crude	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Celt: Pecked, polished	----	----	----	----	----	----	----	----	----	1	1	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
End scraper (hafted)	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
End scraper	----	----	----	----	1	----	----	----	----	----	----	----	----	----	----	----	----	----	2	----	1	----	3	----	----	----	----	----	----	----
Side scraper	----	----	----	----	1	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Graver	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Drill	----	----	----	----	----	----	2	----	----	----	2	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Mano	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Hammer-anvil stone	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Pipe: Chlorite	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Pipe: Clay	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Soapstone vessel fragments	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Quartz crystal	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Pendant	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Potsherds	----	----	----	----	----	----	----	----	----	----	129	----	----	----	----	----	62	----	----	----	----	----	----	----	----	----	----	----	----	----

TABLE 6.—*Occurrence, by sites, of projectile-point and blade types, rock material, chips, and other artifacts*—Continued

Projectile-point and blade types, chips, other artifacts, and potsherds	AU-38						AU-39						AU-40						AU-41						AU-42					
	Chert	Quartz	Quartzite	Greenstone	Total	Percentage	Chert	Quartz	Quartzite	Greenstone	Total	Percentage	Chert	Quartz	Quartzite	Greenstone	Total	Percentage	Chert	Quartz	Quartzite	Greenstone	Total	Percentage	Chert	Quartz	Quartzite	Greenstone	Total	Percentage
Projectile-point types:																														
A																														
B																														
C																			6				6	11.8	2		1		3	15.0
D																			1		1		2	3.9	1				1	5.0
E																														
F	1		2		3	6.3									1		1	1.3												
G																			3				3	5.9						
H													1		1		2	2.6	2				2	3.9						
I		1	1		2	4.2								2			2	2.6	3	1			4	7.9						
J			2		2	4.2								1	2	1	4	5.3		2			2	3.9						
K		1	2		3	6.3							1				1	1.3	1				1	1.9						
L	2		5		7	14.6							1		9	1	11	14.5	7		1		8	15.8	4		1		5	25.0
M			2		2	4.2								2			2	2.6	3				3	5.9	1				1	5.0
N	1		1		2	4.2							1	2	4	1	8	10.5	9		2		11	21.6	6		2		8	40.0
O																			1				1	1.9						
Large blade types:																														
P															1		1	1.3												
Q			5		5	10.4									5	1	6	7.8			2		2	3.9			1		1	5.0
R			1		1	2.0																								
S															1		1	1.3												
T																														
U	2		5		7	14.6							2		18		20	26.9	2			1	3	5.9			1		1	5.0
V		1	13		14	29.1			2		2				17		17	22.5			3		3	5.9						
Total	6	3	39		48	100.0			2		2		6	7	59	4	76	100.0	38	3	9	1	51	100.0	14		6		20	100.0
Percentage	12.5	6.3	81.2			100.0							7.8	9.2	77.7	5.3		100.0	74.6	5.9	17.6	1.9		100.0	70.0		30.0			100.0
Chips:																														
Collection A	3	2	127		132				43		43		6	3	116	1	126		72	9	17	1	99		101	7	12		120	
Percentage	2.3	1.5	96.2			100.0			100.0			100.0	4.8	2.4	92.0	0.8		100.0	72.6	9.1	17.2	1.1		100.0	84.2	5.8	10.0			100.0
Collection B																														
Percentage																														

Other artifacts:																														
Ax: Crude															2	2														
Celt: Crude															1	1														
Celt: Pecked, polished																														
End scraper (hafted)													1				1				1		1							
End scraper													1				1		2				2							
Side scraper																			1				1							
Graver													1				1													
Drill	1				1																									
Mano																														
Hammer-anvil stone																														
Pipe: Chlorite																														
Pipe: Clay																														
Soapstone vessel fragments																														
Quartz crystal																														
Pendant																														
Potsherds																							4						4	

TABLE 6.—*Occurrence, by sites, of projectile-point and blade types, rock material, chips, and other artifacts*—Continued

Projectile-point and blade types, chips, other artifacts, and potsherds	AU-43						AU-44						AU-45						AU-46						AU-47					
	Chert	Quartz	Quartzite	Greenstone	Total	Percentage	Chert	Quartz	Quartzite	Greenstone	Total	Percentage	Chert	Quartz	Quartzite	Greenstone	Total	Percentage	Chert	Quartz	Quartzite	Greenstone	Total	Percentage	Chert	Quartz	Quartzite	Greenstone	Total	Percentage
Projectile-point types:																														
A	1				1	1.6							1				1	0.8												
B													7				7	5.3	1				1	4.5						
C	1		2		3	4.8	4	2			6	40.0	32		2		34	25.9	4		1		5	23.0						
D	5		1		6	9.6							18				18	13.6	4				4	18.0						
E																														
F	3		1		4	6.3			1		1	6.6			1		1	0.8												
G																														
H																														
I		2			2	3.2	2				2	13.4	4		3		7	5.3												
J		4	4		8	12.8							4		1		5	3.8												
K	2	2			4	6.3								1	2		3	2.3	1				1	4.5						
L	2		4		6	9.6							1		8		9	6.8	1	1			2	9.0					1	
M	3	1	2		6	9.6	1	1			2	13.4	3		2		5	3.8	1				1	4.5						
N	12	4			16	25.0	2		1		3	20.0	31		1		32	24.0	4		1		5	23.0					1	
O															1		1	0.8												
Large blade types:																														
P																														
Q			1		1	1.6																								
R																														
S																														
T																														
U			3		3	4.8			1		1	6.6			2		2	1.5	1		1		2	9.0						
V			3		3	4.8									7		7	5.3			1		1	4.5						
Total	29	13	21		63	100.0	9	3	3		15	100.0	101	1	30		132	100.0	17	1	4		22	100.0					2	
Percentage	46.0	20.7	33.3			100.0	60.0	20.0	20.0			100.0	76.5	0.8	22.7			100.0	77.5	4.5	18.0			100.0						
Chips:																														
Collection A	125	57	29		211		102	5	1	3	111		98	21	9		128		105	15	12		132		20	10	2		32	
Percentage	59.4	27.2	13.4			100.0	92.0	4.5	0.9	2.6		100.0	76.5	16.4	7.1			100.0	79.5	11.4	9.1			100.0	62.5	31.2	6.3			100.0
Collection B																														
Percentage																														
Other artifacts:																														
Ax: Crude											1																			
Celt: Crude																1	1													
Celt: Pecked, polished																1	1													
End scraper (hafted)												100.0																		

End scraper																														
Side scraper														1			1													
Graver																														
Drill													3		1		4												2	
Mano																														
Hammer-anvil stone																	2						2						2	
Pipe: Chlorite																														
Pipe: Clay																														
Soapstone vessel fragments					1																									
Quartz crystal					1																									
Pendant										1	1						1													
Potsherds					6						260						141						11							

Table 6.—*Occurrence, by sites, of projectile-point and blade types, rock material, chips, and other artifacts*—Continued

Projectile-point and blade types, chips, other artifacts, and potsherds	AU-48						BA-1						HD-2						HD-3						HD-4					
	Chert	Quartz	Quartzite	Greenstone	Total	Percentage	Chert	Quartz	Quartzite	Greenstone	Total	Percentage	Chert	Quartz	Quartzite	Greenstone	Total	Percentage	Chert	Quartz	Quartzite	Greenstone	Total	Percentage	Chert	Quartz	Quartzite	Greenstone	Total	Percentage
Projectile-point types:																														
A																														
B													2				2													
C													5				5								1		1		2	2.0
D	1				1	5.9							1				1								2				2	2.0
E																														
F																			1				1	6.3	5				5	5.0
G																														
H	1				1	5.9													1				1	6.3	7				7	7.0
I																					1		1	6.3	15				15	14.8
J	1				1	5.9																			1	1			2	2.0
K																									3				3	3.0
L			1		1	5.9													3				3	18.8	8		2		10	9.9
M	1	1			2	11.8													2				2	12.3	13		1		14	13.8
N	1				1	5.9	1				1														27	3	1		31	30.6
O	1				1	5.9													3				3	18.8						
Large blade types:																														
P																														
Q																					2		2	12.3			4		4	4.0
R							1				1														1				1	0.9
S																														
T																														
U	2		3		5	29.5																				1	1		2	2.0
V			4		4	23.3															3		3	18.8	1		2		3	3.0
Total	8	1	8		17	100.0	2				2		8				8		10		6		16	99.9	84	5	12		101	100.0
Percentage	47.0	5.9	47.0			99.9													62.5		37.5			100.0	83.1	5.0	11.9			100.0
Chips:																														
Collection A	141	40	29		210								81	5			86		77	1	27		105		157	7	22		186	
Percentage	67.0	19.0	14.0			100.0							94.0	6.0				100.0	73.5	0.9	25.6			100.0	85.0	3.4	11.6			100.0
Collection B																														
Percentage																														

Other artifacts:																														
Ax: Crude																														
Celt: Crude																														
Celt: Pecked, polished																														
End scraper (hafted)																									1				1	
End scraper																									6	1			7	
Side scraper																														
Graver																														
Drill																														
Mano																														
Hammer-anvil stone																														
Pipe: Chlorite																														
Pipe: Clay																	2													
Soapstone vessel fragments																														
Quartz crystal																	3													
Pendant																														
Potsherds											57						88												2	

Table 6.—*Occurrence, by sites, of projectile-point and blade types, rock material, chips, and other artifacts*—Continued

Projectile-point and blade types, chips, other artifacts, and potsherds	HD-5						HD-6						HD-7						HD-9						RM-1					
	Chert	Quartz	Quartzite	Greenstone	Total	Percentage	Chert	Quartz	Quartzite	Greenstone	Total	Percentage	Chert	Quartz	Quartzite	Greenstone	Total	Percentage	Chert	Quartz	Quartzite	Greenstone	Total	Percentage	Chert	Quartz	Quartzite	Greenstone	Total	Percentage
Projectile-point types:																														
A																														
B																									1				1	1.4
C																														
D													1				1	2.9												
E																														
F																											1		1	1.4
G													1				1	2.9												
H							2				2	18.2	2				2	5.9							1		1		2	2.8
I			1		1								5				5	14.8							2	2			4	5.6
J																										2	1		3	4.1
K													1		1		2	5.9								1	1		2	2.8
L	1				1		3				3	27.3	2				2	5.9							1	3	7		11	15.0
M								1			1	9.1	3				3	8.8							1		1		2	2.8
N	2				2		3	1			4	36.3	9				9	26.5								3	2		5	7.0
O																														
Large blade types:																														
P																											6		6	8.3
Q																											5		5	7.0
R															1		1	2.9									2		2	2.8
S																														
T																														
U													1		1		2	5.9							2		11		13	18.0
V									1		1	9.1	2		4		6	17.0							3		12		15	21.0
Total	3		1		4		8	2	1		11	100.0	27		7		34	100.0							11	11	50		72	100.0
Percentage							72.7	18.2	9.1			100.0	79.5		20.5			100.0							15.0	15.0	70.0			100.0
Chips:																														
Collection A	39		2		41		101	4	11		116		93	4	29		126								16	6	76		98	
Percentage	95.6		4.4			100.0	87.6	3.8	8.6			100.0	74.0	3.0	23.0			100.0							16.4	6.1	77.5			100.0
Collection B																														
Percentage																														
Other artifacts:																														
Ax: Crude																											1	2	3	
Celt: Crude																														
Celt: Pecked, polished																												1	1	
End scraper (hafted)																														

End scraper	----	----	----	----	----	----	1	----	----	----	1	----	----	----	----	----	----	----	----	----	----	----	----	----	1	1	----	----	2	----
Side scraper	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Graver	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Drill	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Mano	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Hammer-anvil stone	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Pipe: Chlorite	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Pipe: Clay	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Soapstone vessel fragments	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Quartz crystal	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Pendant	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	1	----
Potsherds	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	157	----	----	----	----	----	----	----

TABLE 6.—*Occurrence, by sites, of projectile-point and blade types, rock material, chips, and other artifacts*—Continued

Projectile-point and blade types, chips, other artifacts, and potsherds	RM-1A						RM-2						RM-3						RM-4						RM-4A					
	Chert	Quartz	Quartzite	Greenstone	Total	Percentage	Chert	Quartz	Quartzite	Greenstone	Total	Percentage	Chert	Quartz	Quartzite	Greenstone	Total	Percentage	Chert	Quartz	Quartzite	Greenstone	Total	Percentage	Chert	Quartz	Quartzite	Greenstone	Total	Percentage
Projectile-point types:																														
A																														
B																			14				14	14.2	7	1			8	3.3
C																			23	1	1		25	25.3	5		2		7	2.8
D																			20		1		21	21.2	11		5		16	6.9
E																			4				4	4.0						
F																									2		4		6	2.5
G																														
H																			4				4	4.0						
I							1				1	10.0		2			2	6.5							2	1	5		8	3.3
J															1		1	3.2	1				1	1.0	6	2	3	2	13	5.4
K																									5	1	3		9	3.8
L									2		2	20.0	2	3	1		6	19.4	1		3		4	4.0	2	5	28		35	14.4
M																			6				6	6.1	7	4			11	4.6
N													1	3	4		8	25.6	8	2	3		13	13.2	8	2	6		16	6.7
O																														
Large blade types:																														
P																									1		6		7	2.8
Q																					1		1	1.0	1		8		9	3.8
R							1				1	10.0																		
S															1		1	3.2			4		4	4.0						
T															2		2	6.5			2		2	2.0						
U									2		2	20.0	2		4		6	19.4							5	2	32		39	16.5
V									4		4	40.0		1	4		5	16.2							8	1	46	1	56	23.2
Total							2		8		10	100.0	5	9	17		31	100.0	81	3	15		99	100.0	70	19	148	3	240	100.0
Percentage							20.0		80.0			100.0	16.2	28.8	55.0			100.0	82.0	3.0	15.0			100.0	29.2	7.8	61.8	1.2		100.0
Chips:																														
Collection A	139	15	66	4	224		22	9	89		120								112	21	6	1	140		54	15	80	2	151	
Percentage	62.0	6.7	29.5	1.8		100.0	18.5	7.5	74.0			100.0							80.0	15.0	4.3	0.7		100.0	35.8	9.9	53.0	1.3		100.0
Collection B																														
Percentage																														
Other artifacts:																														
Ax: Crude																													1	
Celt: Crude																						12	12							
Celt: Pecked, polished																														
End scraper (hafted)																									1				1	

End scraper	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	3	2	3	----	8	----
Side scraper	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	1	----	----	----	1	----
Graver	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	1	----	1	----
Drill	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	1	----	----	----	1	----	----	----	----	----	----	----
Mano	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	1	----
Hammer-anvil stone	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	1	----	----	----	----	----	3	----
Pipe: Chlorite	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Pipe: Clay	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Soapstone vessel fragments.	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Quartz crystal	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	1	----	----	----	----	----	----	----
Pendant	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	1	----
Potsherds	----	----	----	----	3	----	----	----	----	----	----	----	----	----	----	----	1	----	----	----	----	----	350	----	----	----	----	----	20	----

TABLE 6.—*Occurrence, by sites, of projectile-point and blade types, rock material, chips, and other artifacts*—Continued

Projectile-point and blade types, chips, other artifacts, and potsherds	RM-4B						RM-5						RM-6						RM-7						RM-8					
	Chert	Quartz	Quartzite	Greenstone	Total	Percentage	Chert	Quartz	Quartzite	Greenstone	Total	Percentage	Chert	Quartz	Quartzite	Greenstone	Total	Percentage	Chert	Quartz	Quartzite	Greenstone	Total	Percentage	Chert	Quartz	Quartzite	Greenstone	Total	Percentage
Projectile-point types:																														
A	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
B	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
C	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	1	----	----	----	1	0.7
D	----	----	----	----	----	----	----	1	----	----	1	7.7	----	----	----	----	----	----	----	----	----	----	----	----	3	----	1	----	4	2.7
E	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
F	----	----	1	----	1	1.1	----	----	----	----	----	----	1	----	1	----	2	5.1	----	----	4	----	4	9.5	1	2	4	----	7	4.7
G	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	2	----	----	----	2	1.3
H	----	----	----	----	----	----	----	----	----	----	----	----	----	----	1	----	1	2.6	----	----	1	----	1	2.4	2	----	2	----	4	2.7
I	3	----	1	----	4	4.5	----	----	----	----	----	----	----	1	4	----	5	12.5	1	----	----	----	1	2.4	2	2	4	----	8	5.3
J	----	----	2	----	2	2.3	----	1	----	----	1	7.7	----	----	----	----	----	----	1	1	6	----	8	19.0	1	2	3	----	6	4.0
K	----	2	2	----	4	4.5	1	1	----	----	2	15.4	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
L	2	1	10	----	13	14.8	----	2	----	----	2	15.4	1	----	3	----	4	10.3	----	1	3	----	4	9.5	3	----	9	----	12	8.0
M	1	2	1	----	4	4.5	----	----	----	----	----	----	----	----	1	----	1	2.6	----	----	----	----	----	----	----	----	----	----	----	----
N	----	----	----	----	----	----	----	----	----	----	----	----	----	5	1	----	6	15.4	1	4	4	----	9	21.5	----	3	4	----	7	4.7
O	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Large blade types:																														
P	----	----	2	----	2	2.3	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	1	----	1	0.7
Q	----	----	----	----	----	----	----	----	----	----	----	----	----	----	1	----	1	2.6	----	----	2	----	2	4.7	----	----	6	----	6	4.0
R	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
S	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
T	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
U	3	----	22	----	25	28.5	----	----	4	----	4	30.7	1	----	2	----	3	7.7	----	----	2	----	2	4.7	1	----	44	----	45	30.2
V	2	----	31	----	33	37.5	1	1	1	----	3	23.1	1	----	15	----	16	41.0	----	1	10	----	11	26.3	3	----	43	----	46	31.0
Total	11	5	72	----	88	100.0	2	6	5	----	13	100.0	4	6	29	----	39	100.0	3	7	32	----	42	100.0	19	9	121	----	149	100.0
Percentage	12.6	5.7	81.7	----	----	100.0	15.4	46.2	38.4	----	----	100.0	10.3	15.4	74.3	----	----	100.0	7.3	16.6	76.1	----	----	100.0	12.4	6.1	81.5	----	----	100.0
Chips:																														
Collection A	12	10	159	----	181	----	4	11	63	----	78	----	2	16	139	3	160	----	13	41	130	----	184	----	13	12	176	----	201	----
Percentage	6.6	5.5	87.9	----	----	100.0	5.1	14.1	80.8	----	----	100.0	1.2	10.0	87.0	1.8	----	100.0	7.1	22.4	70.5	----	----	100.0	6.5	6.0	87.5	----	----	100.0
Collection B	7	2	96	----	105	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Percentage	6.7	1.9	91.4	----	----	100.0	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----

Other artifacts:																														
Ax: Crude	----	----	----	----	----	----	----	----	----	1	1	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Celt: Crude	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Celt: Pecked, polished	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
End scraper (hafted)	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
End scraper	----	----	----	----	----	----	----	----	----	----	----	----	1	----	----	----	1	----	----	----	----	----	----	----	----	----	----	----	----	----
Side scraper	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Graver	----	----	----	----	----	----	----	1	----	----	1	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Drill	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Mano	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Hammer-anvil stone	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Pipe: Chlorite	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Pipe: Clay	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Soapstone vessel fragments	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Quartz crystal	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Pendant	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Potsherds	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	1	----	----	----	----	----	----	----

TABLE 6.—*Occurrence, by sites, of projectile-point and blade types, rock material, chips, and other artifacts*—Continued

Projectile-point and blade types, chips, other artifacts, and potsherds	RM-9						RM-10						RM-11						RM-12						RB-3					
	Chert	Quartz	Quartzite	Greenstone	Total	Percentage	Chert	Quartz	Quartzite	Greenstone	Total	Percentage	Chert	Quartz	Quartzite	Greenstone	Total	Percentage	Chert	Quartz	Quartzite	Greenstone	Total	Percentage	Chert	Quartz	Quartzite	Greenstone	Total	Percentage
Projectile-point types:																														
A																									1				1	5.2
B																											1		1	5.2
C																				1			1	1.2						
D															1		1	3.2							1				1	5.2
E																														
F													1		1		2	6.4			1		1	1.2						
G																				2	1		3	3.7						
H																					1		1	1.2						
I													1				1	3.2	2	5	3		10	12.2						
J									1		1				2		2	6.4			2	1	3	3.7			1		1	5.2
K					1																									
L															4		4	13.0	3	4	5		12	14.6						
M																			1	2	2		5	6.1	1		1		2	10.3
N													1				1	3.2							6	1	2		9	47.2
O																			1				1	1.2						
Large blade types:																														
P									1		1				2		2	6.4			3		3	3.7			1		1	5.2
Q																				1	10		11	13.2						
R																														
S																														
T					1																									
U									1		1				7		7	22.7			13		13	16.0			2		2	10.3
V															11		11	35.5		1	17		18	22.0			1		1	5.2
Total					2				3		3		3		28		31	100.0	7	16	58	1	82	100.0	9	1	9		19	100.0
Percentage													9.7		90.3			100.0	8.5	19.5	70.8	1.2		100.0	47.4	5.2	47.4			100.0
Chips:																														
Collection A	6	13	10		29		3	7	45		55		17	2	111		130		13	34	144	2	193		92	13	35		140	
Percentage	20.7	45.0	34.3			100.0	5.3	12.7	82.0			100.0	13.1	1.5	85.4			100.0	6.7	17.7	74.6	1.0		100.0	66.0	9.0	25.0			100.0
Collection B																														
Percentage																														

Other artifacts:																														
Ax: Crude	---	---	---	---	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	1	1	---	---	---	---	---	---	---
Celt: Crude	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Celt: Pecked, polished	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
End scraper (hafted)	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
End scraper	---	---	---	---	---	---	---	---	---	---	---	---	---	---	2	---	2	---	---	---	1	---	1	---	---	---	---	---	---	---
Side scraper	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Graver	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Drill	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Mano	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Hammer-anvil stone	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Pipe: Chlorite	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Pipe: Clay	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Soapstone vessel fragments.	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	2	---	---	---	---	---	---	---	---	---	---	---	---	---
Quartz crystal	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Pendant	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Potsherds	---	---	---	---	4	---	---	---	---	---	---	---	---	---	---	---	1	---	---	---	---	---	---	---	---	---	---	---	22	---

TABLE 6.—*Occurrence, by sites, of projectile-point and blade types, rock material, chips, and other artifacts*—Continued

Projectile-point and blade types, chips, other artifacts, and potsherds	RB-4						RB-5						RB-6						RB-7					
	Chert	Quartz	Quartzite	Greenstone	Total	Percentage	Chert	Quartz	Quartzite	Greenstone	Total	Percentage	Chert	Quartz	Quartzite	Greenstone	Total	Percentage	Chert	Quartz	Quartzite	Greenstone	Total	Percentage
Projectile-point types:																								
A																								
B																								
C													1		1		2	8.7						
D											2													
E																								
F																								
G													2				2	8.7						
H													1				1	4.3						
I															1		1	4.3						
J														1			1	4.3						
K					1																			
L													2				2	8.7						
M													1				1	4.3						
N					2						2		4		1		5	22.0						
O																								
Large blade types:																								
P															1		1	4.3						
Q															2		2	8.7						
R																								
S																								
T																					1		1	
U																								
V													1		4		5	21.7						
Total					3						4		12	1	10		23	100.0			1		1	
Percentage													52.7	4.3	43.0									
Chips:																								
Collection A	4	1	25		30		35	3	3		41		100	4	42		146							
Percentage	13.4	3.1	83.5			100.0	85.4	7.3	7.3			100.0	68.5	2.7	28.8			100.0						
Collection B																								
Percentage																								

Other artifacts:																								
Ax: Crude	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Celt: Crude	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Celt: Pecked, polished	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
End scraper (hafted)	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
End scraper	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Side scraper	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Graver	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Drill	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Mano	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Hammer-anvil stone	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Pipe: Chlorite	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Pipe: Clay	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Soapstone vessel fragments	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Quartz crystal	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Pendant	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Potsherds	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	232	----

TABLE 7.—*Occurrence of pottery series and types, by sites*

Pottery series and types	AU-2			AU-5			AU-7			AU-11			AU-12			AU-13			AU-16			AU-21			AU-23			AU-24		
	Type count	Series count	Percentage	Type count	Series count	Percentage	Type count	Series count	Percentage	Type count	Series count	Percentage	Type count	Series count	Percentage	Type count	Series count	Percentage	Type count	Series count	Percentage	Type count	Series count	Percentage	Type count	Series count	Percentage	Type count	Series count	Percentage
Albemarle Series:																														
Alb. Fabric Impr.				8						7						7						10								
Alb. Net Impr.																						10								
Alb. Cord Marked				17						6						7						26								
Alb. Plain				8						1						3						10								
Alb. Simple Stamped				3												5						8								
Alb. Scraped																						1								
Unclassified				13						3												15								
Total					49	57.0		12			17	38.0					22	65.0					80	89.0						
Marcey Creek Series:																														
Marcey Cr. Plain										1																				
Selden Is. Cord Marked																														
Unclassified																														
Total											1	2.2																		
New River Series:																														
New River Fabric Impr.																														
New Riv. Knot Rough. and Net Impr.																														
New Riv. Cord Marked	5																													
New River Plain	1			2																										
Unclassified	24																													
Total		30	64.0		2	2.3																								

Radford Series:																														
Rad. Fabric Impr.																														
Rad. Knot Rough. and Net Impr.				5																										
Rad. Cord Marked	1			16																										
Rad. Plain				2																										
Unclassified				2																		1								
Total		1	2.0		25	29.2																	1	1.0						
Stony Creek Series:																														
Stony Cr. Fabric Impr.										14						2														
St. Cr. Net Impr. and Roughened																														
St. Cr. Cord Marked				1						3						1						4								
St. Cr. Plain				1						5																				
St. Cr. Simple Stamped				5						1						8						5								
Rivanna Scraped																														
Nottaway Incised																														
Unclassified				2						2						1														
Total					9	10.3					25	55.4					12	35.0					9	10.0						
Unclassified	16	16	34.0	1	1	1.2				2	2	4.4		1						1						1			12	
Total	47	47	100.0	86	86	100.0		12		45	45	100.0		1		34	34	100.0		1		90	90	100.0		1			12	

TABLE 7.—*Occurrence of pottery series and types, by sites*—Continued

Pottery series and types	AU-25			AU-26			AU-27			AU-31			AU-32			AU-33			AU-35 V-1			AU-35 V-2			AU-41			AU-42		
	Type count	Series count	Percentage	Type count	Series count	Percentage	Type count	Series count	Percentage	Type count	Series count	Percentage	Type count	Series count	Percentage	Type count	Series count	Percentage	Type count	Series count	Percentage	Type count	Series count	Percentage	Type count	Series count	Percentage	Type count	Series count	Percentage
Albemarle Series:																														
Alb. Fabric Impr.				6						52									45			5						1		
Alb. Net Impr.				18															2									1		
Alb. Cord Marked				16						152									10			15			2					
Alb. Plain				3						24									5			2								
Alb. Simple Stamped										10									8											
Alb. Scraped																														
Unclassified				5						10									7			11								
Total					48	32.2					248	72.2								77	60.0		33	53.3		2			2	
Marcey Creek Series:																														
Marcey Cr. Plain				4																										
Selden Is. Cord Marked																														
Unclassified																														
Total					4	2.5																								
New River Series:																														
New Riv. Fabric Impr.																														
New Riv. Knot Rough. and Net Impr.																														
New River Cord Marked																														
New River Plain																														
Unclassified																														
Total																														

Radford Series:																														
Rad. Fabric Impr.										5									10			8								
Rad. Knot Rough. and Net Impr.				2						10									8			5								
Rad. Cord Marked				1						5									8			6						1		
Rad. Plain																			3									1		
Unclassified								8											10			6								
Total					3	2.0					20	5.8								39	30.0		25	40.3					2	
Stony Creek Series:																														
Stony Cr. Fabric Impr.				18						15																				
St. Cr. Net Impr. and Roughened				14																										
St. Cr. Cord Marked				25						30									4						2					
St. Cr. Plain										5												2								
St. Cr. Simple Stamped				10															1											
Rivanna Scraped																														
Nottaway Incised																														
Unclassified				22						19																				
Total					89	60.0					69	20.2								5	3.8		2	3.2		2				
Unclassified		1		5	5	3.3				6	6	1.8		1			3		8	8	6.2	2	2	3.2						
Total		1		149	149	100.0		8		343	343	100.0		1			3		129	129	100.0	62	62	100.0	4	4		4	4	

TABLE 7.—*Occurrence of pottery series and types, by sites*—Continued

Pottery series and types	AU-43			AU-44			AU-45			AU-46			BA-1			HD-2			HD-4			HD-9			RM-1A			RM-3		
	Type count	Series count	Percentage	Type count	Series count	Percentage	Type count	Series count	Percentage	Type count	Series count	Percentage	Type count	Series count	Percentage	Type count	Series count	Percentage	Type count	Series count	Percentage	Type count	Series count	Percentage	Type count	Series count	Percentage	Type count	Series count	Percentage
Albemarle Series:																														
Alb. Fabric Impr.	2	----	----	28	----	----	14	----	----	1	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Alb. Net impr.	----	----	----	----	----	----	30	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Alb. Cord Marked	3	----	----	52	----	----	42	----	----	2	----	----	----	----	----	3	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Alb. Plain	----	----	----	16	----	----	12	----	----	2	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Alb. Simple Stamped	----	----	----	35	----	----	----	----	----	1	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Alb. Scraped	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Unclassified	----	----	----	15	----	----	2	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Total	----	5	----		146	56.0	----	100	71.0	----	6	----	----	----	----	----	3	3.5	----	----	----	----	----	----	----	----	----	----	----	----
Marcey Creek Series:																														
Marcey Cr. Plain	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Selden Is. Cord Marked	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Unclassified	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Total	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
New River Series:																														
New River Fabric Impr.	----	----	----	----	----	----	1	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
New Riv. Knot Rough. and Net Impr.	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
New Riv. Cord Marked	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
New River Plain	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Unclassified	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Total	----	----	----	----	----	----	----	1	0.7	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----

Radford Series:																														
Rad. Fabric Impr.	----	----	----	15	----	----	----	----	----	----	----	----	3	----	----	13	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Rad. Knot Rough. and Net Impr.	----	----	----	29	----	----	10	----	----	1	----	----	3	----	----	3	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Rad. Cord Marked	1	----	----	40	----	----	5	----	----	1	----	----	40	----	----	43	----	----	----	----	----	156	----	----	----	----	----	----	----	----
Rad. Plain	----	----	----	3	----	----	----	----	----	----	----	----	2	----	----	14	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Unclassified	----	----	----	14	101	39.0	----	----	----	3	----	----	8	----	----	12	----	----	----	----	----	1	----	----	----	----	----	----	----	----
Total	----	1	----	----	----	----	----	15	10.6	----	5	----	----	56	98.0	----	85	96.5	----	1	----	----	157	100.0	----	----	----	----	----	----
Stony Creek Series:																														
Stony Cr. Fabric Impr.	----	----	----	3	----	----	3	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
St. Cr. Net Impr. and Roughened	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
St. Cr. Cord Marked	----	----	----	4	----	----	4	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
St. Cr. Plain	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
St. Cr. Simple Stamped	----	----	----	----	----	----	2	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Rivanna Scraped	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Nottaway Incised	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Unclassified	----	----	----	----	----	----	2	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Total	----	----	----	----	7	2.7	----	11	7.8	----	----	----	----	----	----	----	----	----	----	1	----	----	----	----	----	----	----	----	----	----
Unclassified	----	----	----	6	6	2.3	14	14	9.9	----	----	----	1	1	2.0	----	----	----	----	----	----	----	----	----	----	3	----	----	1	----
Total	6	6	----	260	260	100.0	141	141	100.0	11	11	----	57	57	100.0	88	88	100.0	----	2	----	157	157	100.0	----	3	----	----	1	----

TABLE 7.—*Occurrence of pottery series and types, by sites*—Continued

Pottery series and types	RM-4			RM-4A			RM-7			RM-9			RM-11			RB-3			RB-7		
	Type count	Series count	Percentage	Type count	Series count	Percentage	Type count	Series count	Percentage	Type count	Series count	Percentage	Type count	Series count	Percentage	Type count	Series count	Percentage	Type count	Series count	Percentage
Albemarle Series:																					
Alb. Fabric Impr	156																				
Alb. Net Impr	10															1					
Alb. Cord Marked	44															5					
Alb. Plain	28															1					
Alb. Simple Stamped	12																				
Alb. Scraped																					
Unclassified	4				20											2					
Total		254	72.6														9	41.0			
Marcey Creek Series:																					
Marcey Cr. Plain																					
Selden Is. Cord Marked																					
Unclassified																					
Total																					
New River Series:																					
New River Fabric Impr																					
New Riv. Knot Rough, and Net Impr																					
New River Cord Marked																					
New River Plain																					
Unclassified																					
Total																					
Radford Series:																					
Rad. Fabric Impr	6																				
Rad. Knot Rough, and Net Impr	10															2					
Rad. Cord Marked	3															4					
Rad. Plain																					
Unclassified																					
Total		19	5.4														6	27.2		226	97.6

Stony Creek Series:																					
Stony Cr. Fabric Impr.	10	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
St. Cr. Net Impr. and Roughened	16	----	----	----	----	----	----	----	----	----	----	----	----	----	----	3	----	----	----	----	----
St. Cr. Cord Marked	27	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
St. Cr. Plain	18	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
St. Cr. Simple Stamped	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Rivanna Scraped	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Nottaway Incised	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Unclassified	6	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Total	----	77	22.0	----	----	----	----	----	----	----	----	----	----	----	----	----	3	13.6	----	1	0.4
Unclassified	----	----	----	----	----	----	----	1	----	----	4	----	----	1	----	4	4	18.2	----	5	2.0
Total	350	350	100.0	----	20	----	----	1	----	----	4	----	----	1	----	22	22	100.0	----	232	100.0

LITERATURE CITED

Butts, Charles.
1933. Geological map of the Appalachian Valley in Virginia with explanatory text. Virginia Geol. Surv., Bull. 42.
1940. Geology of the Appalachian Valley in Virginia, Virginia Geol. Surv., Bull. 52, pt. 1.

Coe, Joffre.
1952. The cultural sequence of the Caroline Piedmont. *In* Archeology of the eastern United States, ed. by James B. Griffin. Chicago.

Cross, Dorothy.
1941. Archeology of New Jersey. Vol. 1. Trenton, N. J.

Evans, Clifford.
1955. A ceramic study of Virginia archeology. With appendix: An analysis of projectile points and blades, by C. G. Holland. Bur. Amer. Ethnol. Bull. 160.

Ford, James A., and Willey, Gordon A.
1949. Surface survey of the Virú Valley, Peru. Amer. Mus. Nat. Hist., Anthrop. Pap., vol. 43, pt. 1.

Fowke, Gerard.
1894. Archeological investigations in the James and Potomac Valleys. Bur. Amer. Ethnol. Bull. 23.

Griffin, James B.
1952. Culture periods in eastern United States archeology. *In* Archeology of the eastern United States, ed. by James B. Griffin. Chicago.

Holland C. G.
1949. Contributions to the archeology of Albemarle County, Virginia, Number Four—Preliminary definition of two foci. Archeol. Soc. Virginia, Quart. Bull., vol. 4, No. 2.
1953. The Madison Run Rockshelter in the Shenandoah Natoinal Park. Archeol. Soc. Virginia, Quart. Bull., vol. 7, No. 4.
1955. An analysis of projectile points and large blades. Appendix *in* A ceramic study of Virginia archeology, by Clifford Evans. Bur. Amer. Ethnol. Bull. 160.

Holland, C. G.; Evans, Clifford; and Meggers, Betty J.
1953. The East Mound. Archeol. Soc. Virginia, Quart. Bull., vol. 7, No. 3.
See also Evans, Clifford.

MacCord, Howard A.
1947. A method of standardizing site numbering. Archeol. Soc. Virginia, Quart. Bull., vol. 2, No. 2.
[MS., 1947–48.] Archeological survey in Virginia during 1947–48 for the Division of History and Archeology, Virginia Conservation Commission, Commonwealth of Virginia. On file with the Archeological Society of Virginia.
1952. The Susquehannock Indians in West Virginia, 1630–1677. West Virginia Hist., vol. 13, No. 4.

Manson, Carl; MacCord, Howard A.; and Griffin, James B.
1944. The culture of the Keyser Farm Site. Michigan Acad. Sci., Arts and Letters. Papers, vol. 29.

McCary, Ben C.
1949. Survey of Virginia-Folsom points No. 142–161. Archeol. Soc. Virginia, Quart. Bull., vol. 4, No. 1.

SCHMITT, KARL.
1952. Archeological chronology of the Middle Atlantic States. *In* Archeol. of the eastern United States, ed. by James B. Griffin. Chicago.

VALENTINE MUSEUM, THE.
1898. Opening address of the president, act of incorporation, constitution, by-laws and catalogue of collections. Richmond, Va.
1903. Report of the exploration of the Hayes' Creek Mound, Rockbridge County, Va. Explored Sept. 1901 by Edward P. Valentine for the Valentine Museum, Richmond, Virginia. Richmond, Va.

WITTHOFT, JOHN.
1947. Smooth-base projectile points from eastern Pennsylvania. Pennsylvania Archeologist, vol. 16, No. 4, pp. 123–130, Milton, Pa.

SMITHSONIAN INSTITUTION
Bureau of American Ethnology
Bulletin 173

Anthropological Papers, No. 58

AN INTRODUCTION TO PLAINS APACHE ARCHEOLOGY—THE DISMAL RIVER ASPECT

By JAMES H. GUNNERSON

CONTENTS

PAGE

Preface 139

Introduction 141

  Review of previous work 141

  Environmental setting 143

Description of Dismal River sites 145

  Excavations in Harlan County Reservoir 145

    Site 25HN37 145

      Introduction 145

      Environmental setting 145

      Houses 146

      Roasting pits 158

      Other pits 159

      Pottery 160

      Work in stone 165

      Work in bone 172

      Work in antler 174

      Work in shell 175

      European trade material 175

      Faunal remains 176

      Vegetal remains 177

      Dendrochronology 177

      Burials 178

      Summary 178

    Site 25HN44 179

  Sandhills sites 180

    Introduction 180

    Environmental setting 180

    Site 25HO1 181

    Site 25HO2 181

    Site 25HO3 181

    Site 25HO5 182

    Site 25HO7 183

      Introduction 183

      Pottery 184

      Work in stone 185

      Work in bone 186

      Work in shell 187

      Trade material 187

    Site 25HO9 187

    Site 25HO21 187

      Introduction 187

      Structures 188

      Pits 188

      Pottery 189

      Work in stone 193

Description of Dismal River sites—Continued
  Sandhills sites—Continued
    Site 25HO21—Continued

PAGE

      Work in bone 198
      Trade material 204
      Vegetal remains 204
      Summary and conclusions 204
    Site 25HO24 205
      Introduction 205
      Pottery 205
      Work in stone 206
      Work in bone 206
    Site 25HO30 207
    Site 25HO31 207
    Site 25HO32 207
    Site 25HY4 207
    Site 25C25 208
    Site 25C27 208
    Site 25C28 208
    Site 25C29 208
    Site 25TM1 208
  Sites in Lincoln County, Nebraska 209
    Site 25LN2 209
    Site 25LN3 210
    Site 25LN4 210
    Site 25LN5 210
    Site 25LN6 211
    Site 25LN7 211
    Site 25LN9 211
    Site 25LN10 212
  Sites in southwestern Nebraska 212
    Site 25CH1 212
      Introduction 212
      Structures 212
      Pottery 213
      Work in stone 214
      Work in bone and antler 215
      Trade material 215
      Faunal remains 216
      Vegetal remains 216
      Dendrochronology 216
      Burials 216
    Site 25CH7 216
    Site 25CH8 216
    Site 25CH14 217
    Site 25DN1 217
      Introduction 217
      Roasting pits 217
      Pottery 218
      Work in stone 219
      Work in bone 220
      Trade material 221
      Dendrochronology 221

Description of Dismal River sites—Continued
  Sites in southwestern Nebraska—Continued PAGE
    Site 25FR15 221
    Site 25FT9 222
  Sites in western Nebraska 222
    Site 25BN2 222
    Site 25GD2 223
    Site 25MO2 224
    Site 25SF1 225
    Site 25SX301 226
    Site 25SX00 226
  Sites in northeastern Colorado 227
    Site Colo.D:4:2 227
    Site Colo.D:1:7 227
    Site Colo.E:2:1 228
    Site Colo.E:7:1 228
    Site Colo.E:14:11 229
    Site Colo.F:15:1 229
    Site Colo.G:4:gen 229
    Site Colo.G:16:6 229
    Site Colo.G:16:8 230
    Site Colo.K:5:1 230
    Site Colo.K:8:2 230
    Site Colo.M:9:6 230
    Site Colo.M:10:2 230
    Site Colo.N:4:1 231
    Site 17 231
    Site 26 231
    Site 38 231
    Site 101 231
    Site 104 231
    Lafayette Site 232
    Byers Site 232
    Boulder Site 232
    Tilden Site 232
    "B. and M. Site" 232
    Weld Site 233
    Weld County general Site 233
    Sterling Site 233
  Sites in southeastern Colorado 233
    Site Colo.S:12:5 233
    Site Colo.Y:12:gen 233
    Site Colo.U:5:9 234
    Site Colo.Y:13:1 234
    Site Colo.Y:14:1 234
    Site Colo.Z:5:7 235
    Site Colo.Z:6:1 235
    Site Colo.Z:14:2 235
  Sites in southeastern Wyoming 236
    Site 48PL11 236
    Site WYO.U:11:1 236
    Site WYO.AA:6:1 236

Description of Dismal River sites—Continued PAGE
Sites in southwestern South Dakota 237
Site 39FA45 237
Site 39FA83 237
Site in western Kansas (14SC1) 237
Dismal River relationships 238
Plains-Dismal River relationships 238
Pecos-Dismal River relationships 241
Promontory-Dismal River relationships 244
Description of the Dismal River Aspect 245
Subsistence 245
Technology 245
Tools and implements 248
Structures 248
Adornment 250
Exchange 251
Religion and mortuary customs 251
Summary and conclusion 251
Appendix 1. Classification of the sites of the Dismal River Aspect 253
Appendix 2. Sources of information concerning Dismal River sites 255
Bibliography 258

ILLUSTRATIONS

PLATES

FOLLOWING PAGE
1. View looking east across 25HN37 260
2. View across excavations for Houses I, II, and III, 25HN37 260
3. *a*, House I, 25HN37, with postholes reopened. *b*, House III, 25HN37, with postholes reopened 260
4. *a*, House IV, 25HN37, with postholes reopened. *b*, House V, 25HN37, with postholes in cross section 260
5. *a*, House VI, 25HN37, with charred poles left on floor. *b*, After charred poles were removed 260
6. *a*, Charred poles on floor of House VI, 25HN37. *b*, Iron ax embedded in fireplace of House VI, 25HN37 260
7. Cross section of a roasting pit at 25HN37 260
8. Restored pottery vessels from 25CH1 260
9. Unusual Dismal River pottery 260
10. Decorated Dismal River pottery 260
11. *a–c*, Pottery pipe fragments from 25HO21. *d–f*, Gravers from 25HN37. *g–i*, Smoothed pieces of caliche from 25HN37 260
12. Projectile points from 25HN37 260
13. Projectile points from 25HO21 260
14. Drills from 25HN37 260
15. Drills from 25HO21 260
16. Knives from 25HN37 260
17. Knives from 25HO21 260
18. Choppers from 25HN37 260
19. End scrapers from 25HN37 260
20. Scrapers with tangs or projections (*a–f* and *h*) and gravers (*g* and *i*) from 25HO21 260
21. Side scrapers from 25HN37 260

PAGE
22. End scrapers with projections or tangs from 25HN37 260
23. *a–c*, Sandstone abraders from 25HN37. *d*, Metate from 25HN37 260
24. Sandstone abraders from 25HO21 260
25. Ground stone artifacts from 25HO21 260
26. Worked bone from 25HN37 260
27. Triangular bone awls (*a–c*) and awl butts (*d–e*) from 25HO21 260
28. Splinter bone awls (*a–c*) and flat bone awls (*d–e*) from 25HO21 260
29. Worked bone from 25HO21 260
30. Bone and antler artifacts from 25HO21 260
31. Bone spatulas (*a*, *b*) and worked rib sections (*c*, *d*) from 25HO21 260
32. Worked bone from 25HO21 260
33. Worked bone from 25HO21 260
34. Bone tools from 25HO21 260
35. Bone fleshers from 25HN37 260
36. Scapula digging tools: *a* and *c* from 25HO21; *b* from 25HN37 260
37. Iron ax found in the fireplace of House VI, 25HN37 260
38. European trade items from 25HN37 260

TEXT FIGURES

13. Dismal River sites 144
14. Ground plan of House I, 25HN37 147
15. Ground plan of excavation 2 at 25HN37 148
16. Ground plan of House II, 25HN37 149
17. Ground plan of House III, 25HN37 150
18. Ground plan of House IV, 25HN37 151
19. Ground plan of House V, 25HN37 152
20. Ground plan of House VI, 25HN37 153
21. Classification chart for chipped points 156
22. Lip forms of Dismal River pottery 164
23. Lip decoration of Dismal River pottery 165
24. Rim profiles of Dismal River pottery 166

PREFACE

Much of the data presented in this paper was obtained by agencies cooperating in the Missouri River Basin archeological salvage program. The main body of information comes from site 25HN37, in the Harlan County Reservoir, south-central Nebraska, and from sites 25HO7, 25HO21, and 25HO24 in the potential Mullen Reservoir area in Hooker County, north-central Nebraska. The River Basin Surveys conducted its initial reconnaissance in these areas in 1946 and 1947, respectively. Excavations at 25HN37 were carried out by the University of Nebraska, Laboratory of Anthropology, under the direction of John L. Champe. Excavation at the Mullen Reservoir sites was conducted by the Nebraska State Historical Society Museum, briefly under A. T. Hill and subsequently under the direction of Marvin F. Kivett.

Data obtained from the potential Platte Reservoir area in Wyoming and the Angostura Reservoir area in South Dakota by initial survey parties of the River Basin Surveys have also been considered.

In the summer of 1949 the University of Nebraska, Laboratory of Anthropology, sponsored a reconnaissance, carried out by J. H. and D. A. Gunnerson, to augment data bearing on the geographical distribution of the Dismal River Aspect. The results of that survey have been included here.

A number of institutions made previously collected material available for study. The following should receive special thanks: the University of Nebraska, Laboratory of Anthropology; the Nebraska State Historical Society Museum; Smithsonian Institution, Missouri River Basin Survey; the University of Denver; the University of Colorado Museum; the Robert S. Peabody Foundation Museum at Phillips Andover Academy; and the University of Utah.

Most of the material presented here was included in a thesis submitted in partial fulfillment of the requirements for the master of arts degree at the University of Nebraska. Research leading to the thesis was supervised by John L. Champe. His guidance in the field and laboratory and his advice and encouragement during the preparation of the manuscript are largely responsible for whatever contribution this paper may represent. Marvin F. Kivett has been most generous with time and information; particularly, he read the manuscript in thesis form and offered valuable suggestions for revision. I am indebted to George Metcalf for the stimulation provided by numerous discussions of the problems involved.

Harry E. Weakly's dendrochronological analysis of the charcoal from 25HN37, resulting in the establishment of a date for the site, was a contribution of major importance. Anna O. Shepard kindly provided technical advice on pottery analysis and examined some of the pottery personally. Much of the faunal material from Hooker County sites was identified by Theodore White. Weldon Frankforter identified faunal material from 25HN37 and some of the bone artifacts from Hooker County. Other individuals who have assisted in various ways include Frank H. H. Roberts, Jr., Waldo R. Wedel, Jesse D. Jennings, E. Mott Davis, Arnold Withers, Herbert Dick, Paul Cooper, and Robert Cumming.

Among the local people throughout the Dismal River area whose assistance and hospitality are warmly remembered are Robert D. Stephenson, Carl Humphrey, Howard Dodd, R. W. Haines, H. H. McConnell, and Robert Halsey.

Dolores Gunnerson assisted in all stages of the endeavor from the reconnaissance of the Dismal River area through preparation of the final manuscript.

J. H. G.

AN INTRODUCTION TO PLAINS APACHE ARCHEOLOGY—THE DISMAL RIVER ASPECT

By James H. Gunnerson

INTRODUCTION

The Dismal River Aspect is an archeological complex occurring in western Nebraska, western Kansas, eastern Colorado, and southeastern Wyoming. The complex, which received its name from the discovery sites on the Dismal River in north-central Nebraska, has been dated at circa 1700 and is now generally attributed to Plains Apache. Dismal River material culture is simple and indicates that the subsistence pattern emphasized hunting, but that agriculture was practiced. The sites are semipermanent villages or temporary camps apparently chosen with little concern for defensibility. The complex might be described as an abbreviated version of some of the better known and more "typical" Plains complexes, with several distinctive additions, but it could probably be even better characterized as having an alien base with an overlay of Central Plains traits. There is evidence linking the Dismal River people to the Southwest, but thus far their relationship to the Plains seems closer.

REVIEW OF PREVIOUS WORK

Components of the Dismal River Aspect were first identified by A. T. Hill, W. D. Strong, and W. R. Wedel through reconnaissance in western Nebraska in the early 1930's. Strong reported the discovery sites on the Dismal River (Strong, 1932, pp. 152–155; 1935, pp. 212–217). Wedel (1935, pp. 180–182) described the brief investigations at 25FT9 in southwestern Nebraska. He has also presented a preliminary report of the excavations at 14SC1 in west-central Kansas (Wedel, 1940 a, pp. 83–86).

At Signal Butte, Strong (1935, pp. 225–239) found Dismal River pottery occurring in the most recent occupation level along with Upper Republican pottery. At Ash Hollow Cave it was possible to distinguish the Dismal River and Upper Republican manifestations stratigraphically, and Dismal River was found to be the more recent of the two (Champe, 1946, pp. 19, 46, 62, 111).

The collections made by E. B. Renaud during his surface reconnaissance of eastern Colorado in the early 1930's contain Dismal River pottery. However, Renaud did not relate his finds specifically to complexes being described in Nebraska, and his terminology is such that one cannot always determine when he is referring to Dismal River pottery in his reports (Renaud, 1931, 1932, 1933, 1935). There are indications in certain of his reports that he may also have collected Dismal River pottery from northeastern New Mexico (Renaud, 1937, 1946).

The chronological position of the Dismal River Aspect in the culture sequence established for the Central Great Plains has been discussed by Wedel (1940 b, p. 323; 1947, pp. 151–152; 1949 b, p. 329). Datable southwestern sherds and pottery pipes, as well as Great Bend sherds, were found with Dismal River material at the Scott County Pueblo site in west-central Kansas. This trade material suggests a date of circa 1700 for the Dismal River Aspect, supporting the more exact dendrochronological datings obtained by Harry E. Weakly for the sites in Nebraska (Hill and Metcalf, 1942, p. 205; Weakly, 1946, pp. 105–110).

The first detailed Dismal River site report was that of excavations by the Nebraska State Historical Society at the Lovitt Site, 25CH1, in southwestern Nebraska (Hill and Metcalf, 1942). This work set up an artifact inventory for the Dismal River Aspect and demonstrated the existence of one focus, the Stinking Water Focus, to which 25CH1, 25DN1, and 25FT9 were assigned. Champe (1949), in the preliminary report of the archeology of White Cat Village, presented important new evidence on Dismal River houses and assigned the site to the Stinking Water Focus.

Recently, Metcalf (1949) has suggested three pottery types for the Aspect; Lovitt Plain, Lovitt Simple Stamped, and Lovitt Mica Tempered. Smith (1949) was able to secure an identification of micaceous sherds (Lovitt Mica Tempered) occurring with Dismal River sand-tempered ware at the Scott County, Kansas, Pueblo Site. These sherds were classified by Tichy as "late Rio Grande micaceous culinary ware."

The relationship of the Dismal River Aspect to other archeological complexes has been considered by various archeologists. Keur (1941, p. 74) has suggested that Dismal River might be ancestral Navaho, but its chronological position precludes such a relationship. Huscher and Huscher (1943) have intimated that stone enclosures in Colorado may have some connection with Dismal River, but they have reached no definite conclusions in the matter.

Speculations concerning the identity of the Dismal River people have appeared in print since 1935 (Strong, 1935, pp. 212–217; Wedel, 1935, p. 181), with more recent works favoring some Apache tribes as the most probable candidates (Hill and Metcalf, 1942, pp. 164–165, 212–213; Wedel, 1940 b, p. 323; 1947, pp. 151–152). Champe (1949, p. 292), in his preliminary report of White Cat Village, supplemented the scanty ethnohistorical data with new cartographic evidence and presented a systematic discussion of the problem, together with a tentative identification of the Dismal River people "with the Cuartelejo and Paloma Apache and other Lipanan peoples of Apacheria of 1700." In the opinion of Wedel the new evidence presented by Champe "virtually clinches" the identity of the Dismal River people (Wedel, 1949 b, p. 329). Secoy (1951) criticized Champe's method but arrived at essentially the same conclusions.

This report presents new archeological data, much of which was obtained in connection with the Missouri River Basin Survey archeological salvage program, and utilizes both published and unpublished data toward a comprehensive description of the Dismal River Aspect.

ENVIRONMENTAL SETTING

The Dismal River people inhabited three somewhat varied portions of the Central Plains area,[1] the High Plains, the Sandhills, and the Colorado Piedmont (fig 13). The High Plains form a broad, monotonously flat belt from 100 to 200 miles wide. They reach from Texas almost to the Black Hills of South Dakota and include the western parts of Nebraska and Kansas as well as eastern Colorado. In this "short-grass country" west of the hundredth meridian, the yearly rainfall averages less than 15 inches. Trees, mainly willow and cottonwood, were restricted for the most part to stream valleys, as were such edible wild fruits as chokecherries, plums, and elderberries (?). The uplands were covered with short grass of several varieties, and yucca, cactus, and sagebrush were to be found. With normal rainfall the grass could support an abundance of game, including bison, antelope, mule deer, prairie dogs, coyotes, and prairie chickens. Only the stream valleys were suited to primitive agriculture, however, and even there the success of crops was closely related to the amount of rainfall.

To the northeast, in Nebraska, the High Plains merge with the sparsely grassed dunes of the Sandhills, where the Loup, Calamus, and Dismal Rivers have cut deep valleys. Again, trees are confined to narrow strips along the watercourses. Small lakes and marshes formed by sand-blocked streams are common.

---

[1] Wedel's discussions of the Plains as the environmental setting for aboriginal existence render summary descriptions of the area necessarily repetitious (Wedel, 1940 b, 1941, 1953).

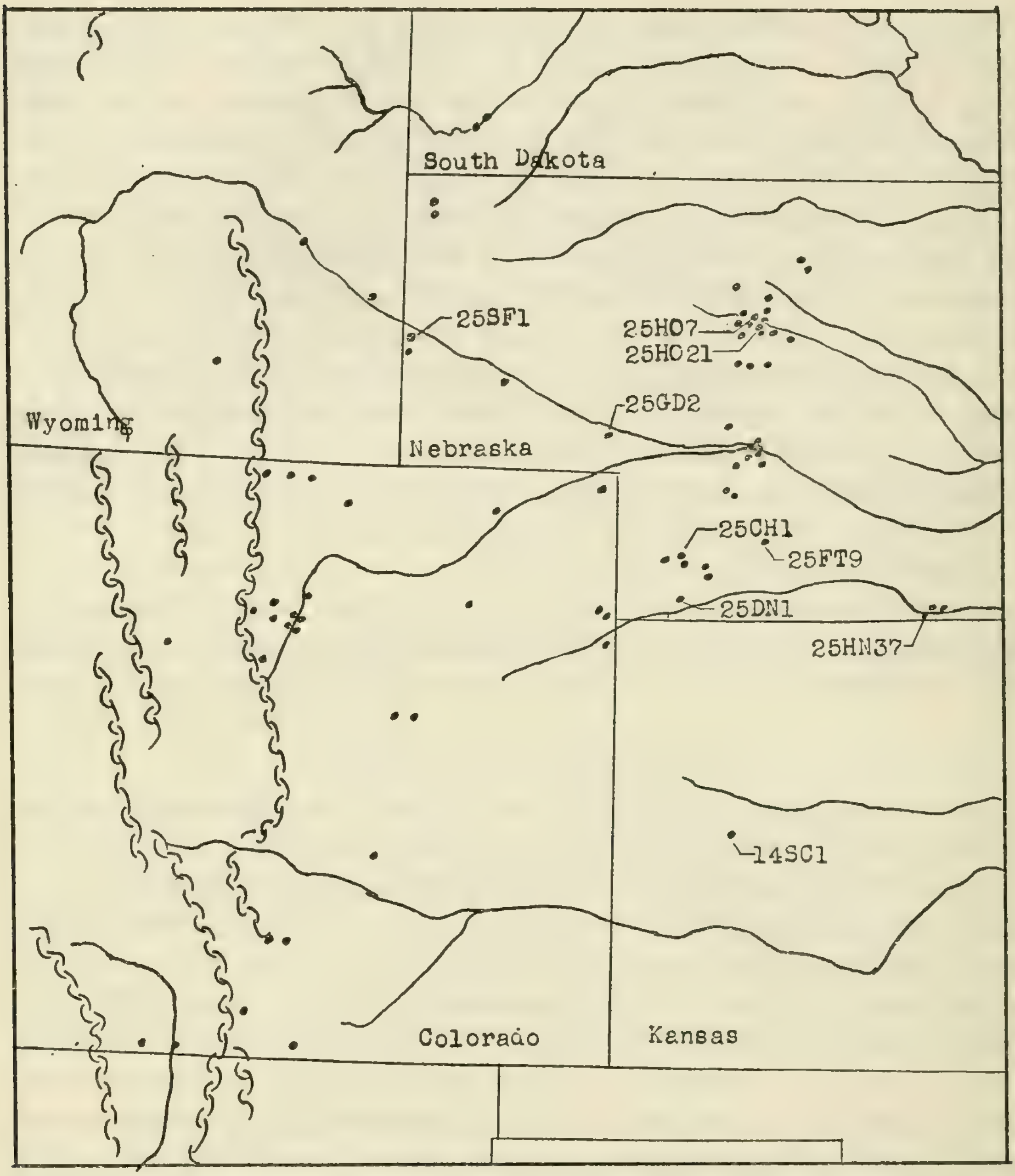

South Dakota
25SF1
25HO7
25HO21
25GD2
Wyoming
Nebraska
25CH1
25FT9
25DN1
25HN37
14SC1
Colorado
Kansas

Figure 13.—Dismal River sites.

Erosion of the western edge of the High Plains loess mantle has resulted in the rugged zone known as the Colorado Piedmont. Near the foot of the Rocky Mountains it is better watered and supports more vegetation than either the High Plains proper or the Sandhills. The rivers of the Plains flow east, providing east-west travel routes. Their tributaries, though often small, would have assured north- and south-bound travelers a source of water between the major streams.

In general, the area to which the Dismal River people were restricted, by choice or by other factors, favored a subsistence economy based on hunting, but it did not preclude agriculture on a limited scale, and there is evidence to indicate that the Dismal River people took advantage of horticulture opportunities.

DESCRIPTION OF DISMAL RIVER SITES

EXCAVATIONS IN HARLAN COUNTY RESERVOIR

SITE 25HN37

INTRODUCTION

Site 25HN37 (White Cat Village) is located at the eastern edge of the region inhabited by the Dismal River people. It is in an area more favorable to a hunting-farming economy than any other in which Dismal River sites have yet been found. The preliminary survey of 25HN37 was made in the summer of 1946 by a party representing the Missouri River Basin Survey of the Smithsonian Institution. Members of the party, Marvin F. Kivett and J. M. Shippee, were able to locate the fireplaces of three houses, as well as several concentrations of refuse, by means of small test excavations.

In 1948, a summer field school conducted by the Laboratory of Anthropology, University of Nebraska, under the direction of John L. Champe, made more extensive excavations at the site. A preliminary report of this work has been published (Champe, 1949). In 1949, the Laboratory's second summer field school continued excavations at the site. Part of the additional information obtained in 1949 was reported briefly at the Seventh Plains Conference for Archeology (Gunnerson and Gunnerson, MS.). Further work has been done at the site subsequent to 1949 but the results were not available for inclusion.

ENVIRONMENTAL SETTING

Harlan County (Moran, Covell, and Abashkin, 1930) is part of a broad, loess-mantled plain which slopes gently eastward and which has been modified by the valleys of the Republican River, Sappa Creek, and Prairie Dog Creek, whose intermittent tributaries have cut it into a series of divides, seldom over a mile wide. Several terraces occur along the larger streams, including Prairie Dog Creek. The native deciduous trees, chiefly willow, ash, elm, boxelder, hackberry, and cottonwood, are confined to the watercourses.

The climate of Harlan County is characterized by wide seasonal variations, with rather long and cold winters. The springs are usually cool with considerable precipitation. The fall season is long with moderate temperatures and only occasional rainy periods. The average growing season is 151 days, between May 4th and October 2d. The mean annual rainfall is about 20 inches, 80 percent of which occurs between April 1st and October 1st. Precipitation in July and August, however, is frequently rather low, and this factor, together with strong, hot winds which accelerate evaporation, sometimes causes short droughts. Crop failures, however, are rare.

Much of the bottom land in the county is Hall Silt Loam, a fertile soil with high powers of moisture retention, which has produced large yields of corn under modern cultivation methods. The land was covered with an abundant growth of prairie grass before 1870, the year when the first white settlers arrived. Such grass, along with water and a broken terrain, would have assured the presence of game.

Site 25HN37 is located about 6 miles southeast of Alma, Nebr., in Harlan County, just south and southwest of the center of sec. 24, T. 1 N., R. 18 W. The village extends approximately 1,000 feet along a terrace which forms the north bank of Prairie Dog Creek at that point, and surface material is fairly abundant over an area 250 feet wide. The village itself is nearly level, with a slight rise to the north. On the south there is an abrupt drop to the creek 30 feet below. On the west and southwest, the terrace slopes gradually down to bottom land which is flooded occasionally by the Prairie Dog. This stream follows a meandering course, but is swift flowing and contains water throughout the year. It is spring fed and has a shale bottom in places. About 3 miles below the site it empties into the Republican River. The country around 25HN37 is rough, for drainage has resulted in the carving of steep-sided canyons, leaving only tongues of the original plain.

The people living at 25HN37, then, enjoyed the advantages of a level, well-drained site close to water, timber, and land tillable by primitive methods, surrounded by country which offered prospects of good hunting in all directions.

Completion of the Harlan County Dam in 1951 and the subsequent impounding of water has profoundly altered the environs of 25HN37. One branch of the reservoir, reaching up the Prairie Dog well beyond the site, covers the bottom lands at normal pool, and at maximum pool the village itself will be submerged.

HOUSES

A comparison of the first six house patterns excavated at White Cat Village indicates that structures with five main posts were most common. Five of the six houses were represented by five postholes, nearly evenly spaced around a fireplace. The other house (House II), had six postholes, symmetrically spaced. The six house patterns had an average radius of 6.8 feet considering the fireplace as the center and the circle of post molds as the circumference. All were nearly the same size, ranging from 5.9 to 7.5 feet in radius.

There were several smaller postholes scattered around most of the house areas, but they formed no particular pattern. In the case of four houses, however, there was a pair of posts opposite the east side of the pentagon and about twice as far from the fireplace as the main

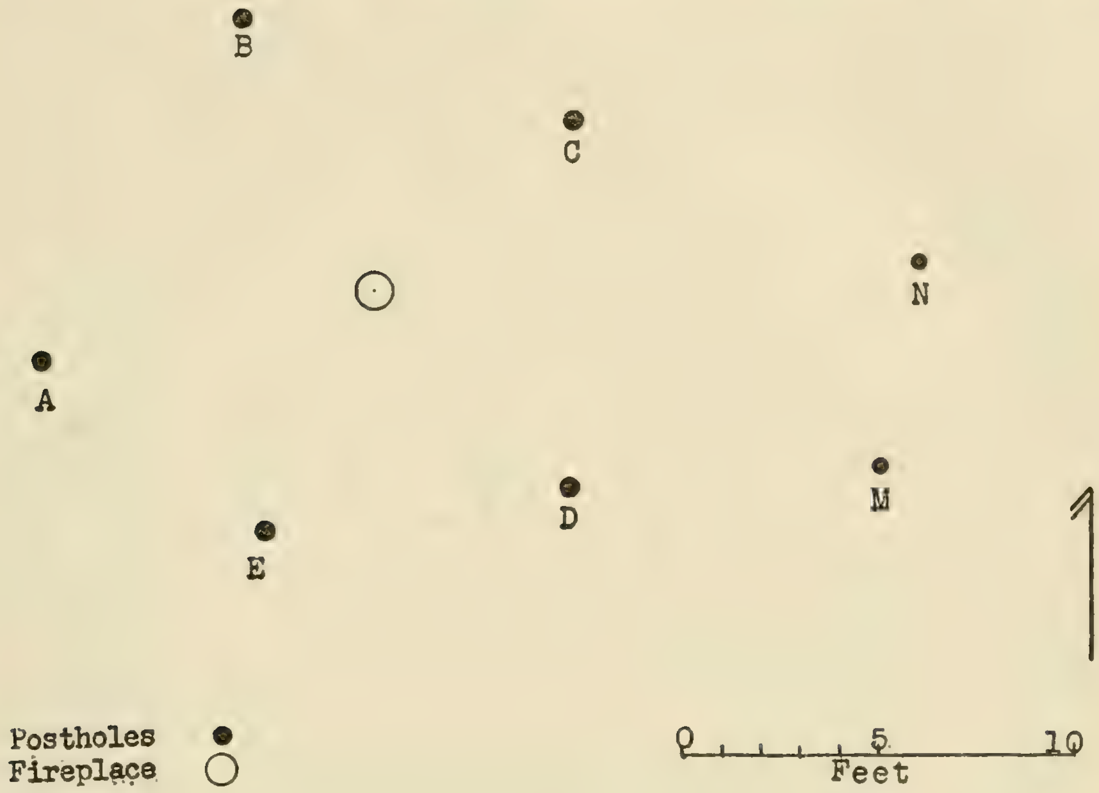


FIGURE 14.—Ground plan of House I, 25HN37.

Posthole data

Posthole	A	B	C	D	E	M	N
Depth (feet)	1.4	1.5	0.9	1.0	1.1	1.1	0.9
Diameter (feet)	.7	.8	.7	.7	.7	.4	.4

postholes. These pairs of postholes were spaced on an average of 5.3 feet apart. The position of these paired posts in relation to the houses suggests that they represent part of an entrance structure.

House I.—House I (fig. 14 and pl. 3, *a*) at White Cat Village was represented by five main postholes arranged symmetrically around a fireplace, with two additional postholes to the east which probably represent part of an entrance. The main postholes formed a circle about 15 feet in diameter. House I and House II overlapped (fig. 15) so that the fireplaces were some 6 feet apart. The floors of the two lodges could not be distinguished, hence no stratigraphy could be established. The artifacts from these two houses are listed together in table 1.

House II.—House II (fig. 16 and pl. 2) is represented by six postholes arranged symmetrically around a fireplace, but no evidence of possible entrance postholes was observed. Five of the six postholes were easily located at the floor level, but the arrangement suggested the presence of a sixth posthole near the fireplace of House I. This sixth post was found but only after cutting through part of the floor at the edge of the hearth of the House I fireplace. Posthole A (fig. 16) was interpreted as representing an auxiliary post set beside posthole

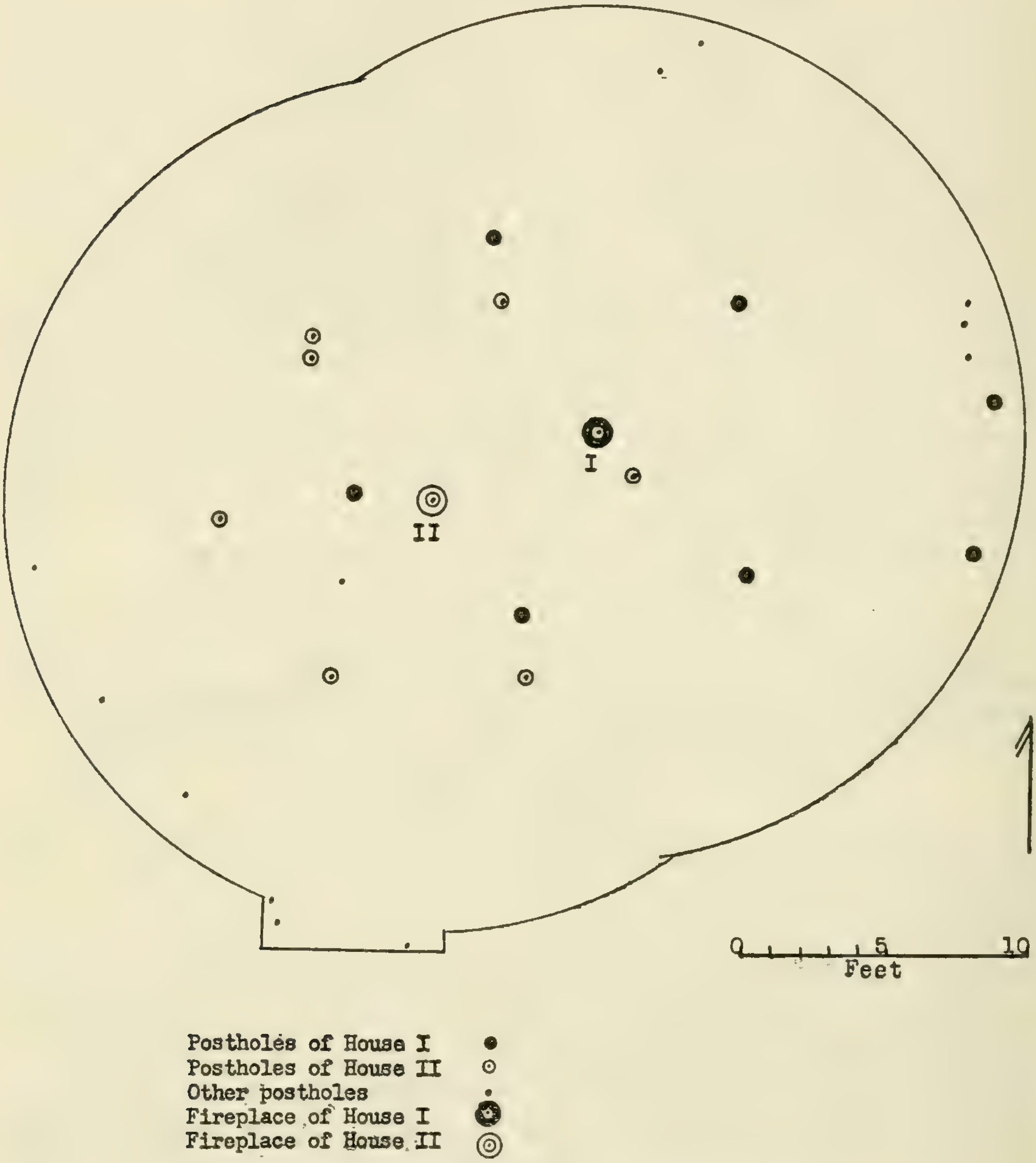

I
II
0 5 10
Feet
Postholes of House I ●
Postholes of House II ⊙
Other postholes •
Fireplace of House I
Fireplace of House II ◎

Figure 15.—Ground plan of excavation 2, 25HN37.

A′, perhaps to strengthen a weak portion of the structure. The main postholes formed a circle about 14 feet in diameter.

The only clue to the relative age of Houses I and II was the obliteration of one of the postholes of House II near the fireplace of House I. It would appear that activity around the fireplace (of House I) probably obliterated the posthole of the earlier house (House II). The floors were just beneath the lowest level of cultivation, which makes it seem unlikely that the houses had been much more than 8 inches deep. In some places the floors had been furrowed by the plow. A small trash-filled pit was found within the area excavated for Houses I and II. It does not seem to represent an integral part of either of the houses and will be discussed as a separate feature.

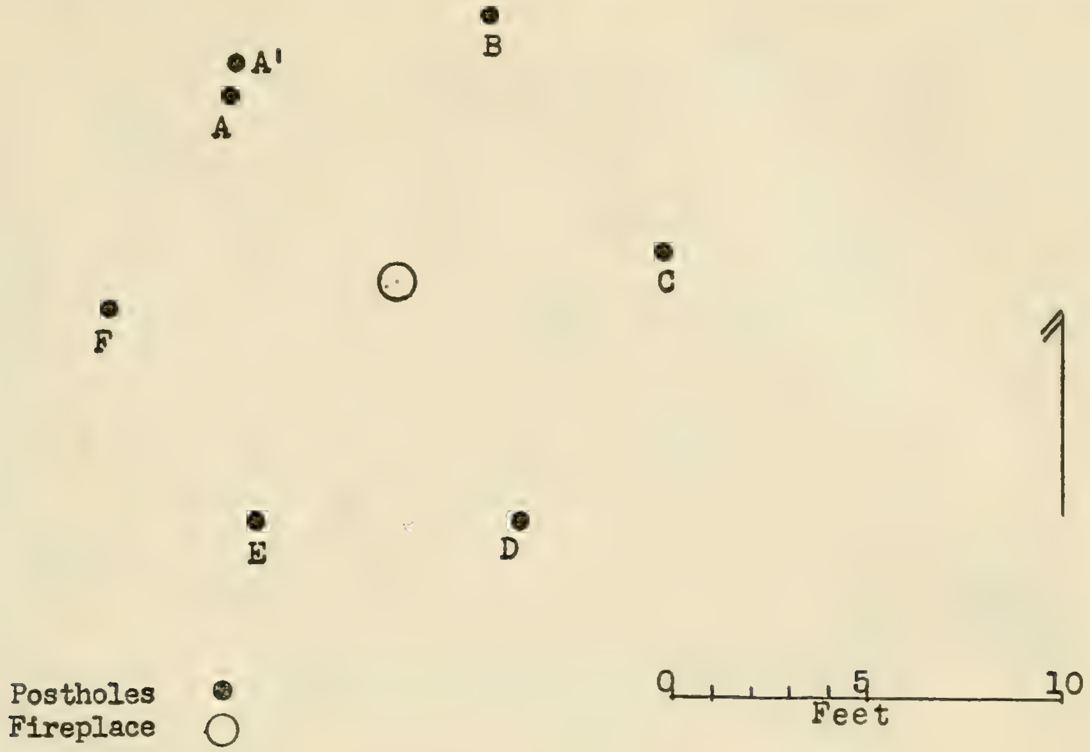


FIGURE 16.—Ground plan of House II, 25HN37.

Posthole data

Posthole	A	A′	B	C	D	E	F
Depth (feet)	1.0	1.5	1.4	1.5	1.5	1.0	1.4
Diameter (feet)	.8	.8	.7	.8	.7	.7	.7

TABLE 1.—*Artifacts from Houses I and II*

Description	Number	Comment
Pottery:		
Rim	4	
Body	270	
Stone, worked:		
Scrapers	17	
Points	2	
Drills	1	
Other	27	
Stone, unworked	57	
Bone, worked:		
Scapulae	3	Probably all hoe fragments.
Awls	2	
Shaft wrenches	2	
Other	1	
Bone, unworked	79	Including teeth.
Shell, unworked	4	
Vegetal material	2	Fragments of black walnut (*Jugla nigra*) shell.

House III.—House III (fig. 17 and pl. 3, *b*) was represented by five postholes arranged symmetrically around a fireplace and by two additional postholes to the east interpreted as possible entrance posts. The main postholes formed a circle about 12 feet in diameter. An area 15 feet in radius was cleared around the fireplace in a search for additional evidence of the house. Seven additional postholes were observed, but none of them appeared to represent part of the main house structure. One shallow trash-filled pit was encountered

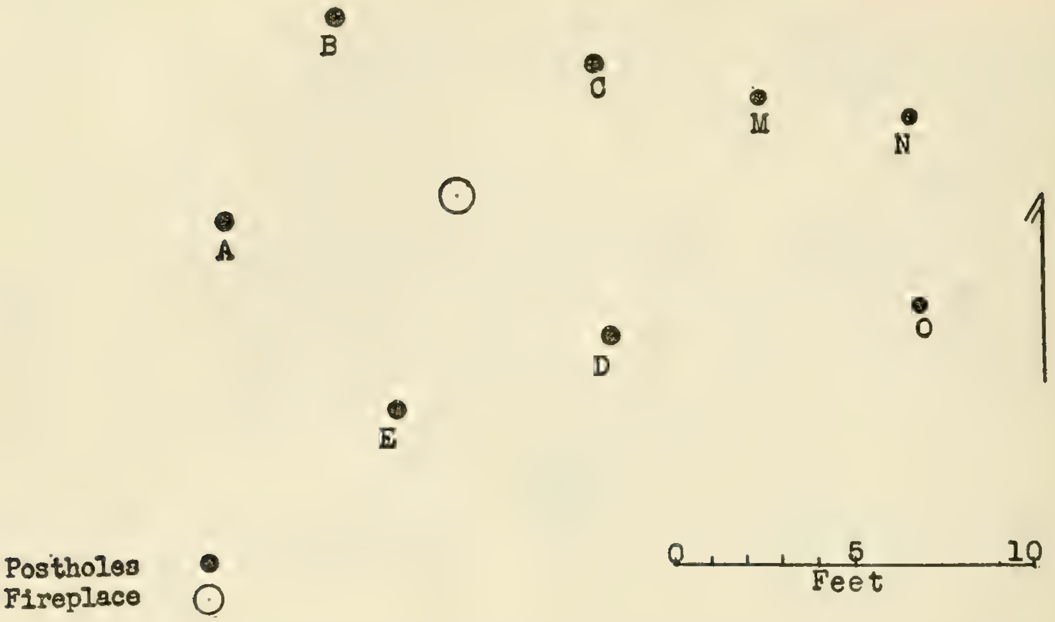


Figure 17.—Ground plan of House III, 25HN37.

Posthole data

Posthole	A	B	C	D	E	N	O
Depth (feet)	0.5	0.8	0.9	1.0	0.6	Not recorded	
Diameter (feet)	.5	.4	.4	.7	.6	0.5	0.5

in clearing this house, but since it was considered to be intrusive, it will be discussed in the section on pits.

Part of the floor had been removed by cultivation, which may account in part for the shallowness of the postholes. It was not possible to determine whether this house had been shallower than the others or whether more erosion had taken place. Artifacts (table 2) were common on the house floor, but none were of special importance.

Table 2.—*Artifacts from House III*

Description	Number	Description	Number
Pottery:		Stone, unworked	16
Rim	2	Bone, worked:	
Body	30	Bead	1
Stone, worked:		Bone, unworked	138
Scrapers	26		
Points	2		
Other	32		

House IV.—House IV (fig. 18 and pl. 4, *a*) was represented by five postholes arranged symmetrically around a fireplace, and by two additional postholes probably representing an entrance. The main postholes formed a circle about 12 feet in diameter. Two other postholes were found within a radius of 15 feet around the fireplace, but they did not appear to represent part of the main structure. A large burned area about 4 by 5 feet was found northeast of the

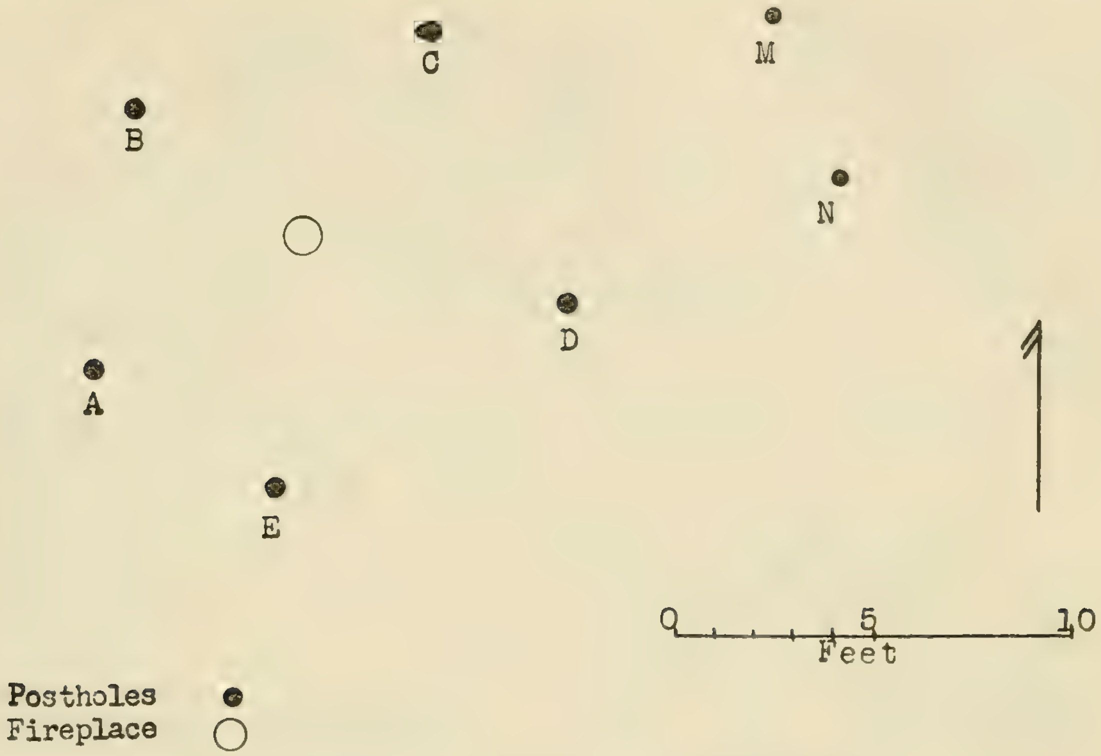


FIGURE 18.—Ground plan of House IV, 25HN37.

Posthole data

Posthole	A	B	C	D	E	M	N
Depth (feet)	1.3	1.2	1.2	1.3	0.8	Not recorded	
Diameter (feet)	.8	.8	.7	.7	.7	0.5	0.5

fireplace at about floor level. The significance of this area is unknown. The artifacts from this house are listed in table 3.

TABLE 3.—*Artifacts from House IV*

Description	Number	Comments
Pottery:		
Body	15	Dismal River.
Stone, worked:		
Scrapers	8	
Points	2	
Drills	1	
Other	22	
Bone, unworked	9	
Shell, unworked	1	

House V.—House V (fig. 19 and pl. 4, *b*) was represented by five postholes symmetrically arranged around a fireplace, and two additional postholes that probably represent an entrance. The main postholes formed a circle about 14 feet in diameter. An excavation approximately 19 feet in diameter was made around the fireplace and was extended an additional 7 feet to the east in order to locate the entrance postholes. The house was unusual in that no extra postholes and no artifacts were found within the area excavated.

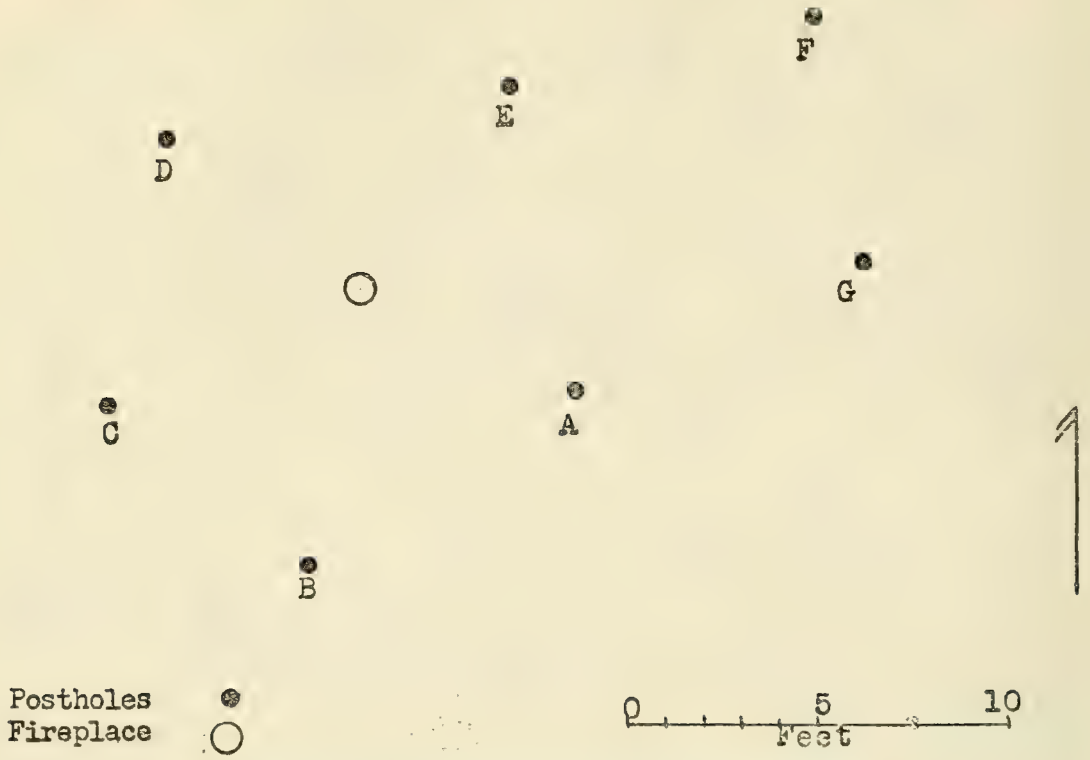


Figure 19.—Ground plan of House V, 25HN37.

Posthole data

Posthole	A	B	C	D	E	F	G
Depth (feet)	0.9	1.0	1.1	1.0	1.0	0.8	0.6
Diameter (feet)	.9	.8	.8	.8	.7	.5	.5

House VI.—House VI (fig. 20 and pl. 5) had been burned and consequently it provided much information concerning house structure which was not available from the other houses. Again, in this house there were five main postholes arranged symmetrically around a fireplace. No evidence of entrance postholes could be found, however. The main postholes formed a circle about 14 feet in diameter. Seven additional postholes were found within or very near House VI. All but one of these were small and none of them seemed to represent a part of the structure.

Just outside of the circle of main postholes was a band of earth burned red and orange and containing a great deal of charcoal. This band, although not burned to a solid color, could be followed about three-fourths of the way around the house. The gap was at the east. Part of the burned earth and charcoal had been removed by cultivation, but much of the charcoal had not been disturbed and the orientation of the fallen poles could be determined. The charcoal appeared to be both on top of and surrounded by the burned earth.

The outer edge of the burned band was especially sharp to the southwest and the inner edge tended everywhere to thin out gradually. Within the circle of main postholes, charcoal and burned earth were

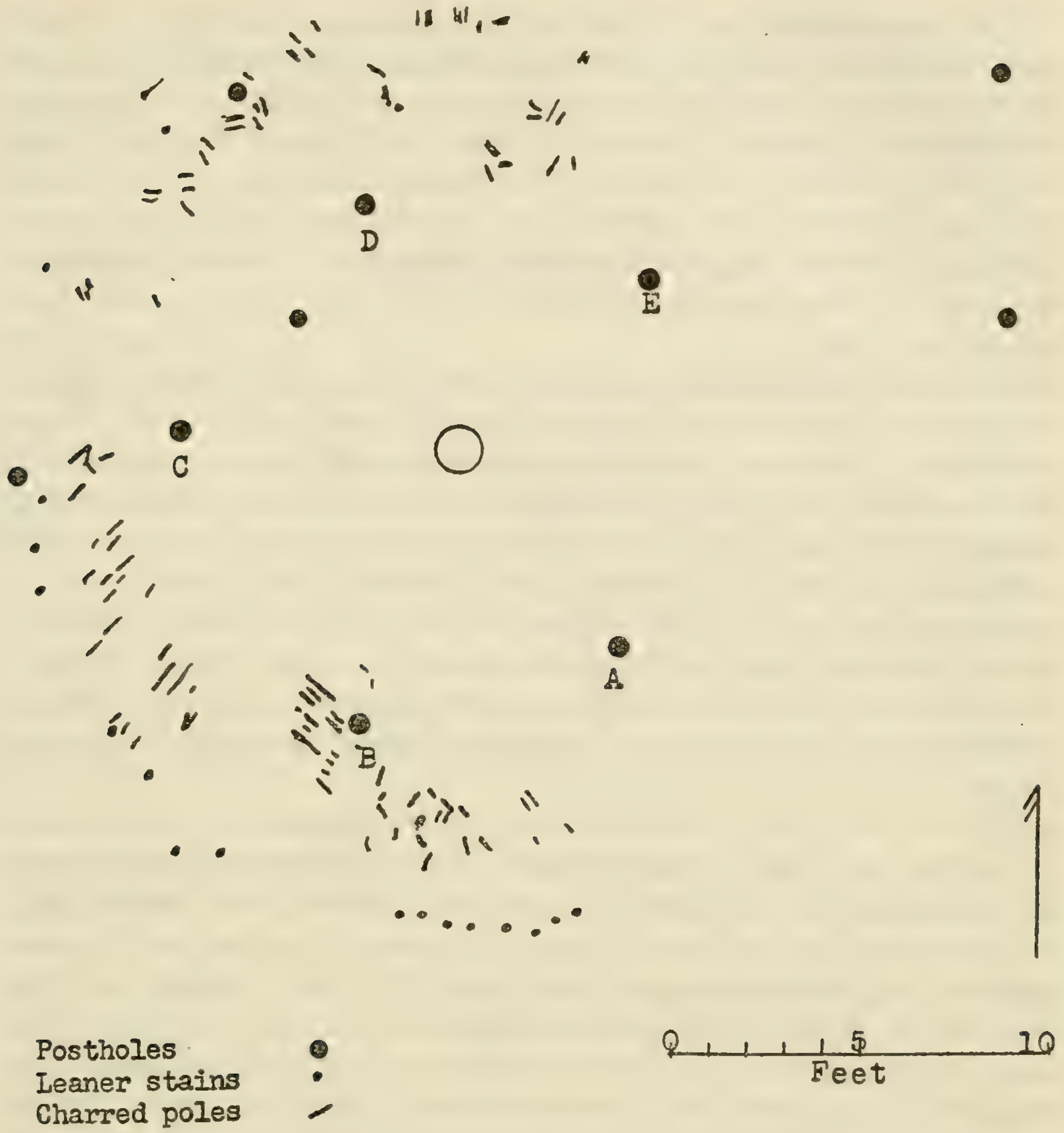


FIGURE 20.—Ground plan of House VI, 25HN37.

Posthole data

Posthole	A	B	C	D	E
Depth (feet)	1.3	1.5	1.2	1.5	1.4
Diameter (feet)	.7	.8	.6	.9	.9

relatively scarce, but much of the floor was covered with a sooty black stain.

On the south side and about a foot beyond the burned area was an arc of eight small round stains rather evenly spaced. These stains, which were interpreted as the impressions of the butts of leaner poles, were brown and black, with charcoal or decayed wood present in four of the eight. Nine other similar stains were found at intervals along the west side of the house. These 17 stains approximate an arc about 25 feet in diameter and concentric with the circle formed by the main postholes.

The interpretation of the stains as the remains of leaner poles is substantiated by the orientation of the pieces of charcoal, many of which lay nearly radially from the center of the house. The sticks in one group, however, lay nearly parallel to one another but almost at right angles to the radius of the house circle (pl. 6, *a*). A few of these pieces lay over posthole B. Since nearly all of the charred poles lay outside of the circle of main postholes, it seems more logical to interpret these remains as part of the wall structure rather than part of the roof.

The charred poles mentioned above which were not lying radially, were in line with some of the small round stains at the south edge of the lodge. Between these poles and stains were some other smaller pieces of charcoal, also lying approximately in line. If it could be assumed that these all represent the same leaners, the leaners would have been at least 9 feet long, the distance from the ends of the charred poles to the stains with which they were in line. The horizontal distance from the leaner stains to the circle of main posts is about 4½ feet, hence the center posts would have been 7 to 8 feet high if the leaners had terminated at stringers joining the tops of the main posts.

The fireplace of this house was not recognized until the main postholes were found, after which it was easily located in the center of the pentagon. It first appeared as a black circle containing a piece of iron, burned bone, hematite, charcoal, burned earth, stone, and ash, all of which suggested a trash-filled pit. Later, when this area was cross sectioned, it was found to be a basin-shaped fireplace containing some refuse and covered with a black sooty material which suggested that the fire had been smothered. The black sooty material contained a considerable amount of hard, shiny, porous substance, some of which appeared fibrous in nature.

A small sample of this material was heated in an open crucible over a gas flame. At first a very strong stench like that of burning animal matter was given off. Continued heating resulted in the material's changing from black to gray and eventually to buff.

The iron object in the fireplace proved to be a trade ax (pl. 37) which had been forcibly driven into the fireplace (pl. 6, *b*). The ax was embedded in the west edge of the fireplace in such a position that the handle would have been pointing east and upward at about 45 degrees, indicating that whoever struck it into the fireplace would have been standing on the east side.

Speculation has led to at least two possible explanations for this unusual occurrence. It has been suggested that the ax had been intentionally placed in the fire in order to burn out an old handle prior to inserting a new one. In such a case, it might well have been driven deep into the ground to protect the blade from excess heat. If this explanation were correct, it seems unlikely that the ax would have been abandoned even if the house had burned down before it could be removed from the fire. The scarcity of trade material at this site and at other Dismal River sites suggests that such an ax would have been an object of considerable value.

Another possible explanation for the presence of the ax is that it was left by an enemy who may have fired the house and struck his ax into the fireplace as a sort of coup.

Two additional metal objects were found in House VI. A copper jingle (pl. 38, *c*) was found in the loose dirt in the house while the floor was being leveled. There is little doubt that the jingle came from the floor of the house, but the exact provenience is not known. The other metal object (pl. 38, *d*) was a piece of sheet brass, about 1.5 cm. wide and 3.4 cm. long. It had been doubled along its short axis but it had not been completely flattened together. It was found below the cultivated soil about 7 feet southeast of the fireplace.

A few other artifacts from House VI deserve special mention. A flint projectile point, type NBa (fig. 21), was found among some charred poles about 11 feet north of the fireplace. This point had been blackened by fire but was not spalled from excessive heat. Part of a red sandstone metate (pl. 23, *d*) was found at the top of posthole A. A second fragment of this metate was picked up on the surface. A concentration of large flecks of hematite was found in an area which they had stained bright red and which was surrounded by a very black stain. The red stain covered an area about 1 by 1½ feet and was located about a foot south of the fireplace. The artifacts from House VI are listed in table 4.

TABLE 4.—*Artifacts from House VI*

Description	Number	Comment
Pottery:		
Rim	1	One sherd found in a posthole.
Body	3	
Stone, worked:		
Points	2	
Scrapers	7	
Other	9	
Stone, unworked	2	Plus many hematite specks.
Bone, worked	2	
Bone, unworked	10	Plus many small burned fragments.
Metal objects:		
Iron ax	1	
Copper jingle	1	
Sheet brass	1	

Discussion of houses.—A house-post pattern consisting of five main postholes arranged nearly symmetrically around a fireplace was established for five of the six houses excavated at White Cat Village (table 5). The remaining house had six main postholes. All posts had been

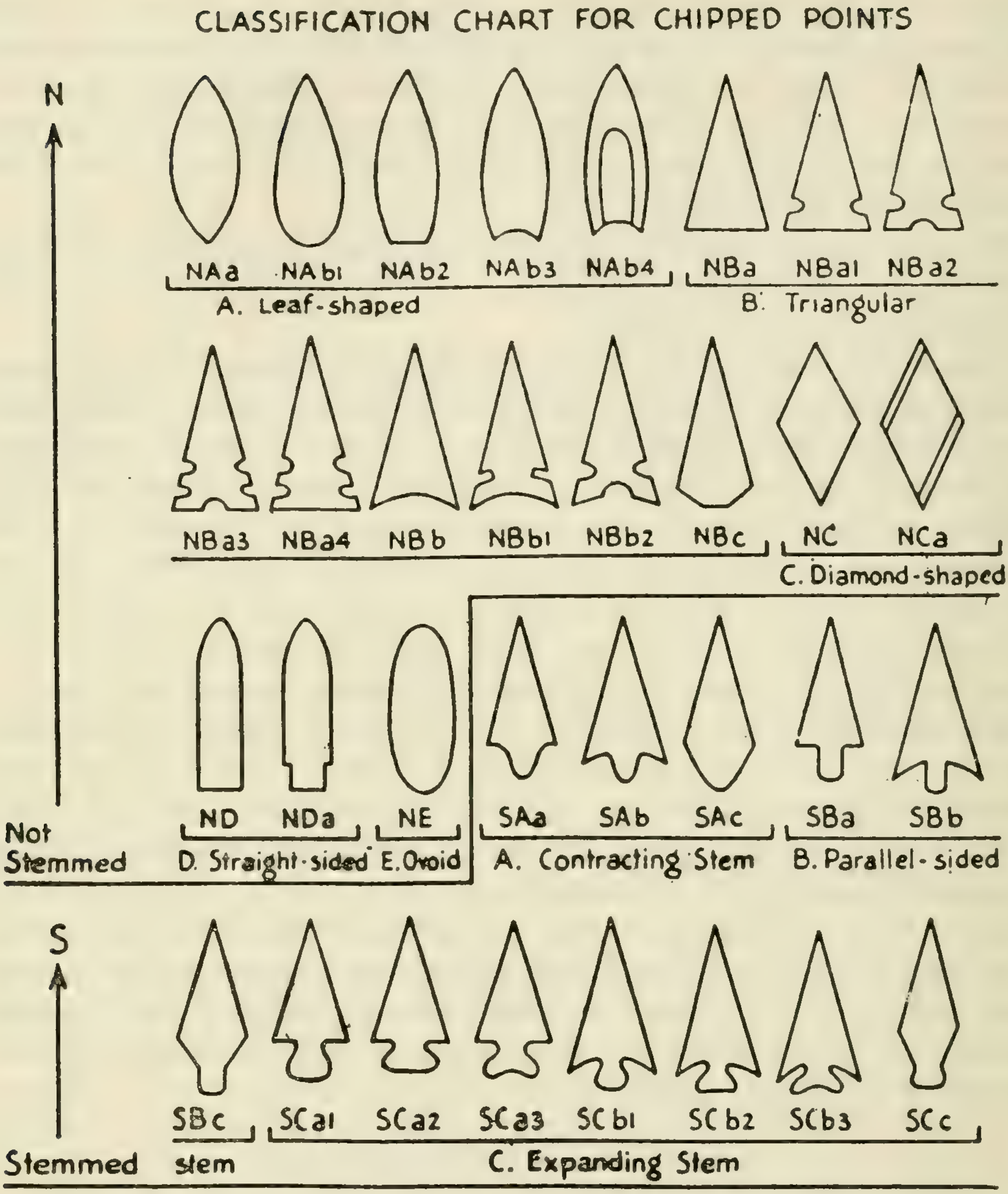

CLASSIFICATION CHART FOR CHIPPED POINTS
N
NAa
NAb1
NAb2
NAb3
NAb4
NBa
NBa1
NBa2
A. Leaf-shaped
B. Triangular
NBa3
NBa4
NBb
NBb1
NBb2
NBc
NC
NCa
C. Diamond-shaped
ND
NDa
NE
SAa
SAb
SAc
SBa
SBb
Not Stemmed
D. Straight-sided
E. Ovoid
A. Contracting Stem
B. Parallel-sided
S
SBc
SCa1
SCa2
SCa3
SCb1
SCb2
SCb3
SCc
Stemmed
stem
C. Expanding Stem

Figure 21.—Classification chart for chipped points (Strong, 1935, p. 89).

set vertically. Four of the houses with five main posts had two additional postholes located about twice as far from the center as were the main postholes, and opposite the easternmost side of the main post pattern. These additional postholes were interpreted as representing part of an entrance structure. Other postholes were found in all but one of the houses, but these posts showed no regularity in location and were not considered to represent parts of the main house structures.

The fireplaces were all basin-shaped areas of burned earth, usually containing gray ash. They were always at a level slightly higher than the floor level and always in the center of the lodges. None of the houses had prepared floors. The floors were considered to be at the level where the postholes appeared; usually this was also the level at which most of the detritus and artifacts occurred. In all six houses the floor level was at or just below the level of deepest cultivation. The original depth of the houses can be estimated as from 0.8 to 1.0 foot below the surface, but this is only a guess, since the fields in which the houses were found have been under cultivation for many years.

The symmetry of the posthole patterns suggests that circles had been constructed upon which the postholes were dug. The posthole patterns were drawn to scale, and studied in the laboratory. The center of the house was determined by constructing the perpendicular bisectors of the sides and accepting the center of the area included within the intersections of these lines as the center of the circle upon which the postholes lay. In the case of each house a circle was drawn around this center so as to intersect as many postholes as possible. The centers of all of the postholes in Houses III, IV, and VI (figs. 17, 18, and 20) were found to lie within 0.3 foot of such a circle. The centers of all but one of the postholes in each of Houses I, II, and V (figs. 14, 16, and 19) were found to be within 0.2 foot of such a circle. The centers of the odd postholes were 1.4, 0.6, and 0.9 feet from the respective circles. These variations could represent adjustments to the length of available construction material. The difference between the longest and shortest sides formed by the main postholes is only 1.4 feet in House III but is as much as 3.4 feet in House IV. There is, of course, no simple way of constructing a regular pentagon. It is noteworthy that the pentagonal main post pattern was also found at House II at the Lovitt Site (Hill and Metcalf, 1942, pl. IV, 1; pl. X, 2). Further comparison of the Dismal River houses with other types of lodges will be made when the Dismal River Aspect is discussed in general.

TABLE 5.—*Data on houses at White Cat Village (measurements are in feet)*

	Data for House—					
	I	II	III	IV	V	VI
Number of main posts	5	6	5	5	5	5
Diameter of main post circle (approximate)	15	14	12	12	14	14
Distance from center of house to center of fireplace	1.0	0	.6	.7	.8	.6
Greatest distance from center of house to main postholes	7.8	7.4	6.3	5.8	7.5	7.4
Least distance from center of house to main postholes	6.3	6.7	5.9	6.3	6.6	7.0
Average distance from center of house to entrance postholes	14.0	None	13.7	13.0	13.7	None
Greatest distance between adjacent center postholes	10.2	7.6	7.6	8.7	9.2	9.8
Least distance between adjacent main postholes	7.2	6.7	6.1	5.3	6.6	7.3
Distance between entrance postholes	5.4	None	5.3	4.4	6.5	None
Number of main postholes with bone "wedges"	3	3	1	0	0	0
Diameter of fireplace (average)	1.8	1.7	3.0	2.0	2.0	2.2

ROASTING PITS

One so-called roasting pit was found at 25HN37. This pit originally appeared as a ring of burned earth 3.4 feet east-west by 3.7 feet north-south. The ring varied from about 3¼ inches wide on the north side to less than ½ of an inch wide on the south. The fill within this ring included charcoal, bone, potsherds, and burned bone.

When this ring had been completely exposed, the south half of the pit was cleared out, leaving the shell of burned earth. The resulting profile was extended beyond the pit so as to present an entire cross section of the pit (pl. 7). The mouth of the pit was found 0.6 of a foot below the surface and the bottom of the pit was 2.1 feet below the mouth. The pit belled out to a maximum diameter of 4.3 feet east-west and 4.0 feet north-south.

The pit had been filled in layers. Immediately above the hard, burned floor was a thin layer of ash; above this was a layer of charcoal less than 1 inch thick. Just above the charcoal came a layer of mixed earth, rich in ash, and above that a layer of nearly clean yellow clay ranging from 4 inches in depth near the center to 11 inches near the walls. Above this was a softer layer, consisting almost entirely of charcoal and ranging from 2 inches thick near the wall to 4 inches thick near the center. The charcoal was very fine grained and resembled charred bark or grass. Above the layer of charcoal was another layer of nearly clean yellow clay ranging from 2 inches in depth near the center to 5 inches in depth near the wall. The top layer was rich in camp detritus and varied from 4 to 8 inches in thickness.

Artifacts occurred almost exclusively in the upper level of the pit, although an articulated bison metatarsus flesher (pl. 35, *a*) was found in the relatively clean layer just below the top level. The faunal

Table 6.—*Artifacts found in roasting pit*

Description	Number	Comment
Pottery:		
Rims	2	
Body	28	
Stone, worked:		
Points	2	
Scrapers	3	
Abraders	1	
Stone, unworked	13	
Bone, worked: Fleshers	2	One articulated.
Bone, unworked:		
Beaver	6	Six incisors and a ramus fragment.
Bison	22	
Deer	2	
Turtle shell	31	
Turtle bone	28	
Other	10	
Shell, unworked	4	
Antler, unworked: Deer	1	

remains found in the pit were both burned and unburned, whole and fragmentary. The presence of artifacts, together with other village detritus, seems to indicate secondary use as a refuse pit. The artifacts found in the roasting pit are listed in table 6.

OTHER PITS

Perhaps the most striking difference between White Cat Village and the Lovitt Site is the lack of the trash-filled pits at the former which are so common at the latter. Two refuse pits were found at White Cat Village by the Smithsonian survey party in 1946 (Kivett, MS., 1946). The larger pit was basin shaped, somewhat oval, and measured 7 feet by 5.5 feet by 26 inches deep. The pit contained fragmentary animal bones, rim and body sherds, projectile points, a chipped-flint drill, bone beads (?), bone awls, a flint knife, a beaver mandible, a stone pipe-bowl fragment, end scrapers, mussel shells, cut antler tips, and a scapula hoe fragment. Above this detritus was a layer of ash 3 inches thick, 12 inches below the surface.

The second basin was 42 by 38 inches, and 17 inches deep. It contained animal bones, body sherds, an end scraper, flint chips, a cut antler tip, and black soil mixed with charcoal and some ash. Both of these pits are comparable to the pits at the Lovitt Site.

The University of Nebraska field school located a small trash-filled pit at the southwest edge of House II. The pit was 36.5 inches by 32 inches by 6 inches deep, and occurred 8 inches below the surface. This pit, which was basin shaped, contained charcoal, 20 fragments of unworked bison bone (including 5 skull fragments and 6 fragments of teeth), 2 beaver bone fragments, a bone awl made of a bison ulna fragment, and a Dismal River pottery body sherd.

In the northwest part of House III, another concentration of refuse was noted. This area was about 6.9 feet by 2.6 feet, but quite thin. Since the material lay just above the floor level of the house, which was from 7 to 10 inches below the surface, it may represent refuse dumped into the house after it had been abandoned. No outline of a pit was observed, and, for that reason, it seems incorrect to designate this area as a trash-filled pit. The area did, however, contain a substantial amount of faunal remains, 93 specimens in all, including specimens identified as coyote, bison, deer, beaver, turtle, and mussel. The bone found was both burned and unburned; only one item, a coyote metapodial bone bead, showed human workmanship. The area also yielded 12 pieces of stone, either unworked or only slightly modified, except for a fragment of a sandstone abrader. Pottery recovered from the area included 37 body sherds and 6 rim sherds, all Dismal River.

Other smaller concentrations of camp refuse were found about the area, especially near the creek bank. However, this more frequent occurrence along the scarp may be due, at least in part, to the fact that most of the testing was done in this area because it was not under cultivation. These concentrations were shallow, with no definite outline, and appear to be areas where camp detritus was dumped. The depth at which such detritus was found varied from just below the surface to about 15 inches below the surface and may represent the old village level. Most of the material, however, was in the upper 8 to 10 inches. Since the field has been cultivated for at least 30 years, with consequent erosion, the relative depth of the material here does not seem significant.

POTTERY

Pottery is the most diagnostic artifact of the Dismal River complex, and for that reason it is important to note that the pottery from 25HN37 is almost identical with the pottery from the other sites comprising the Stinking Water Focus. The pottery recovered from 25HN37 by the University of Nebraska, Laboratory of Anthropology, is classified in table 7. The classification follows that previously established by Metcalf (1949, pp. 73–78), who has defined two pottery types, Lovitt Plain and Lovitt Simple Stamped, on the basis of surface treatment, and a third, Lovitt Mica Tempered, on the basis of the distinctive tempering material.

As Metcalf has pointed out, this classification is not entirely satisfactory since on some restored pots there are both plain and simple stamped areas. If such a pot were broken, sherds of both types would result. Also, there is evidence, especially on rim and shoulder areas, suggesting that simple stamping had been smoothed over.

TABLE 7.—*Pottery found at 25HN37*

Description	Number	Description	Number
Dismal River sherds:		Body sherds:	
Rim sherds:		Lovitt Simple Stamped	552
Lovitt Simple Stamped	20	Lovitt Plain	403
Lovitt Plain	50	Lovitt Mica Tempered	2
Undeterminable	6	Undeterminable	25
Total	76	Total	982
		Non-Dismal River sherds	5
		Unidentifiable	4
		Total	1,067

Tempering.—The tempering material in the pottery, when present, consisted almost entirely of fine sand, well smoothed by water action.

The size of the particles ranged upward to 1.0 or 1.5 mm. in diameter with occasional particles as large as 5 mm. in diameter. All the sherds contained a large quantity of much finer sand or grit. Under the microscope, there appeared to be just enough clay in the paste to hold this abundance of fine sand or grit together. Since texture, exclusive of larger sand particles, was so similar from sherd to sherd, it would appear that the fine grit or sand was not added to the paste but was rather in the clay chosen for the paste. In some cases no coarser sand had been added. However, 195 out of a sample of 224 sherds showed larger sand particles, the smallest of which were from 5 to 10 times as large in diameter as the largest of the small particles. The amount of tempering visible varied from about 2 to 25 particles per square centimeter on the cross section of a freshly broken sherd.

The surface of two sherds from 25HN37 presented a "spangled" appearance because of large amounts of mica included in the paste. The mica occurs in addition to the other tempering materials—fine sand in the paste and larger sand tempering. These sherds are classified as Lovitt Mica Tempered (Metcalf, 1949, pp. 77–78).

Four other sherds from the site contain sufficient finely divided mica to give the sherds a slightly metallic appearance. The surface of these sherds is not quite smooth but does not show simple stamping. The paste of the sherds, except for the finely divided mica, is well within the range of the rest of the pottery from the site. One of these sherds was examined by Anna O. Shepard who states (letter dated May 5, 1950):

> Not only are the mica flakes closely packed and parallel, they are also distorted which gives the paste an undulent structure. The peculiar surface appearance of this sherd may be due to exposure of mica flakes which would not absorb carbon as readily as the paste.

Texture.—Of the 224 sherds examined under a microscope, 29 contained only the very fine sand or grit which probably occurred naturally in the clay. In these sherds, the fineness of the grit was not quite as uniform as it was in the others, but the size of the particles was decidedly smaller than particles of sand believed to have been deliberately added.

The very sandy, granular texture of this pottery probably accounts for its breaking into such small fragments, but the sherds do not crumble as might be expected. The breaks are, for the most part, along straight lines and perpendicular to the surface. There is no tendency for the sherds to split and practically no tendency for the surface to scale off. In general, the paste is fine textured, compact, and well worked.

Hardness.—A random sample of 132 sherds was tested for hardness, with the following results:

Harder than 1 but softer than 2 (selenite), 5 sherds.
Harder than 2 but softer than 3 (calcite), 74 sherds.
Harder than 3 but softer than 4 (fluorite), 45 sherds.
Harder than 4 but softer than 5 (apatite), 8 sherds.

The average hardness of the sherds tested was about 3.

Density.—The density of 26 of the larger sherds from 25HN37 was determined by weighing them first in air and then suspended in water. The following formula was used:

$$\text{Density}=\frac{\text{dry weight in air}}{(\text{dry weight in air}-\text{weight in water})\div(\text{density of water})}$$

The dry weight of these sherds varied from 6.36 to 39.42 grams. The average density was 1.95 grams per cubic centimeter, and the range was from 1.71 to 2.19 grams per cubic centimeter. The median density was 1.97 grams per cubic centimeter. Two-thirds of the sherds have densities between 1.85 and 2.05 grams per cubic centimeter.

Porosity.—Twenty of the sherds which were checked for density were also checked for porosity. Sherds which had not been mended were selected for this particular test to eliminate any error caused by the closing of pores by glue. The sherds adsorbed and absorbed an average of 0.12 gram of water per cubic centimeter of sherd. The range was from 0.04 to 0.19 gram of water per cubic centimeter of sherd. The median was between 0.12 and 0.13 gram of water per cubic centimeter of sherd. The average porosity was about 0.12 gram per cubic centimeter as determined from the dry weight, wet weight, and weight suspended in water.

The following formula was used:

$$\text{Porosity}=\frac{\text{wet weight in air}-\text{dry weight in air}}{(\text{dry weight in air}-\text{weight in water})\div(\text{density of water})}$$

Color.—The color of the sherds varies from buff through gray to black. The majority are dark gray. Frequently a thick, very dark sooty deposit is found on excavated sherds and occasionally on sherds found on the surface. Usually sherds are the same color all the way through, but sherds with a dark surface and a buff core or buff sherds with a dark core are not uncommon. Sherds also occur in which the two surfaces are of different colors. When dark sherds were refired in an oxidizing atmosphere in a small electric furnace, they assumed a buff to bright orange color. Since the sherds are predominantly gray to black, the buff color may represent refiring rather than a different method of manufacture. The dark sherds were probably fired in a reducing atmosphere.

Surface treatment.—The surface treatment of pottery from 25HN37 is in general of two types. About four-tenths of the sherds have smooth surfaces and about six-tenths show parallel ridges ranging in height from barely perceptible to about 1 mm. This treatment has been designated by such terms as simple stamping, grooved paddling, or thong-wrapped paddling.

The ridges tend to be placed vertically on the vessels but occasionally even converge or cross. Adjacent ridges may almost touch or be more than a centimeter apart. The width of ridges is, for the most part, about 0.2 or 0.3 cm. The exact width is not easily determined because the ridges do not always have sharp edges. Also, even single ridges are frequently not of uniform width. Generally the spaces between the ridges are a little wider than the ridges.

Under a microscope the only difference between the appearance of the surface on the ridges and in the grooves is that the ridges show a little more polish. Both of these surfaces are comparable to the surface of most smooth sherds. There are a few smooth sherds, however, which have an almost waxy appearance and "feel." In general, the surfaces vary from smooth, almost polished, to perceptibly rough to touch. There has been some speculation as to whether or not all the pottery was once simple stamped and some of it smoothed later before the pot dried.

Only rarely can evidence, such as fine scratches, be found on the exterior which might indicate the method used to smooth the pottery. Occasionally more or less horizontal striations are found on the inside of the pot. These appear to be scratches made by an anvil or other tool, or possibly by foreign particles adhering to such a tool.

The surfaces, especially the outer, appear to have a much finer texture than does the paste in general. It is not possible to identify a slip on any of the sherds, so it has been suggested that fine clay particles may have been floated to the surface by means of rubbing or patting with a smooth object. Such floating would have been slight, for even on the smoothed sherds the very fine sand of the paste is still evident although it does appear much less gritty than a freshly broken edge.

Decoration.—There is very little surface decoration on the pottery found. One sherd exhibited a narrow line which appears to have been trailed in before the pot was dry. A few sherds show what appears to be black paint on a buff surface. This is found more frequently on the inside of sherds, usually on sherds without simple stamping and with a black core. The small size of the sherds makes it impossible to identify design elements. The "painted" sherds frequently have an almost shiny or burnished surface. Many of the plain sherds, both smooth and simple stamped, have this burnished quality in varying degrees. It becomes more noticeable when the sherds are cleaned with a dry brush after most of the dirt has been removed by washing.

Rim form.—There were 76 rim sherds collected from 25HN37. Over half of these have lips which are rounded to slightly flattened with occasional evidence of slight thickening. Smaller numbers of rims were either gradually thinned toward the lip or had a beveled lip. The lips of still other rims were flared in, flared out, or flared both in and out (fig. 22). The flaring seems to have resulted from pressure on the lip while the paste was still soft.

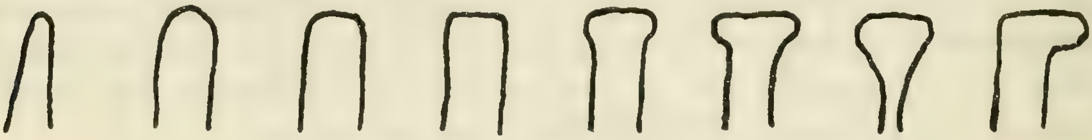


Figure 22.—Lip forms of Dismal River pottery.

The five cases of lip decoration occurred on flared lips and consisted of elongated incised punctates placed tangently and diagonally on the lip, single chevrons pointing tangently on the lip, and broad, smooth depressions impressed in the lip (fig. 23).

Vessel shape.—There were no restorable pots and very few large rim sherds found at 25HN37, so no definite statement can be made as to vessel shape. On the basis of the three largest rim sections, the rims appear to have been simple. They vary from almost vertical to somewhat flaring (fig. 24). Four rim sherds were large enough to indicate that the rims joined the body of the vessel in a smooth curve. Four rims, representing at least three vessels, ranged in height from 3.7 to 4.0 cm. The diameters of the orifices of two vessels were estimated to be about 14 cm. and 22 cm.

Thickness.—The thickness of 50 rim sherds, measured in such a way as to avoid any thickening or thinning of the lip, averaged 0.6 cm. The thickness of 70 plain body sherds selected at random averaged 0.65 cm. whereas a group of 80 simple stamped body sherds similarly selected averaged 0.61 cm. Considered as a group of 150 sherds, they averaged 0.63 cm. in thickness.

Pipes.—Two, or possibly three fragments of pottery appear to be from pipes. They are too fragmentary to be identified as to type. The paste is untempered and not unlike that of the vessel sherds.

Comments on pottery.—The Smithsonian party found a flake of mica about 1.5 by 0.5 cm. in size in an irregular pit at 25HN37. This find is of special interest since there is a question as to whether the rare mica-tempered Dismal River sherds represent trade ware from the Southwest or are of local manufacture. The presence of mica indicates that the Dismal River people knew of this mineral and secured it for some purpose, perhaps for the manufacture of pottery.

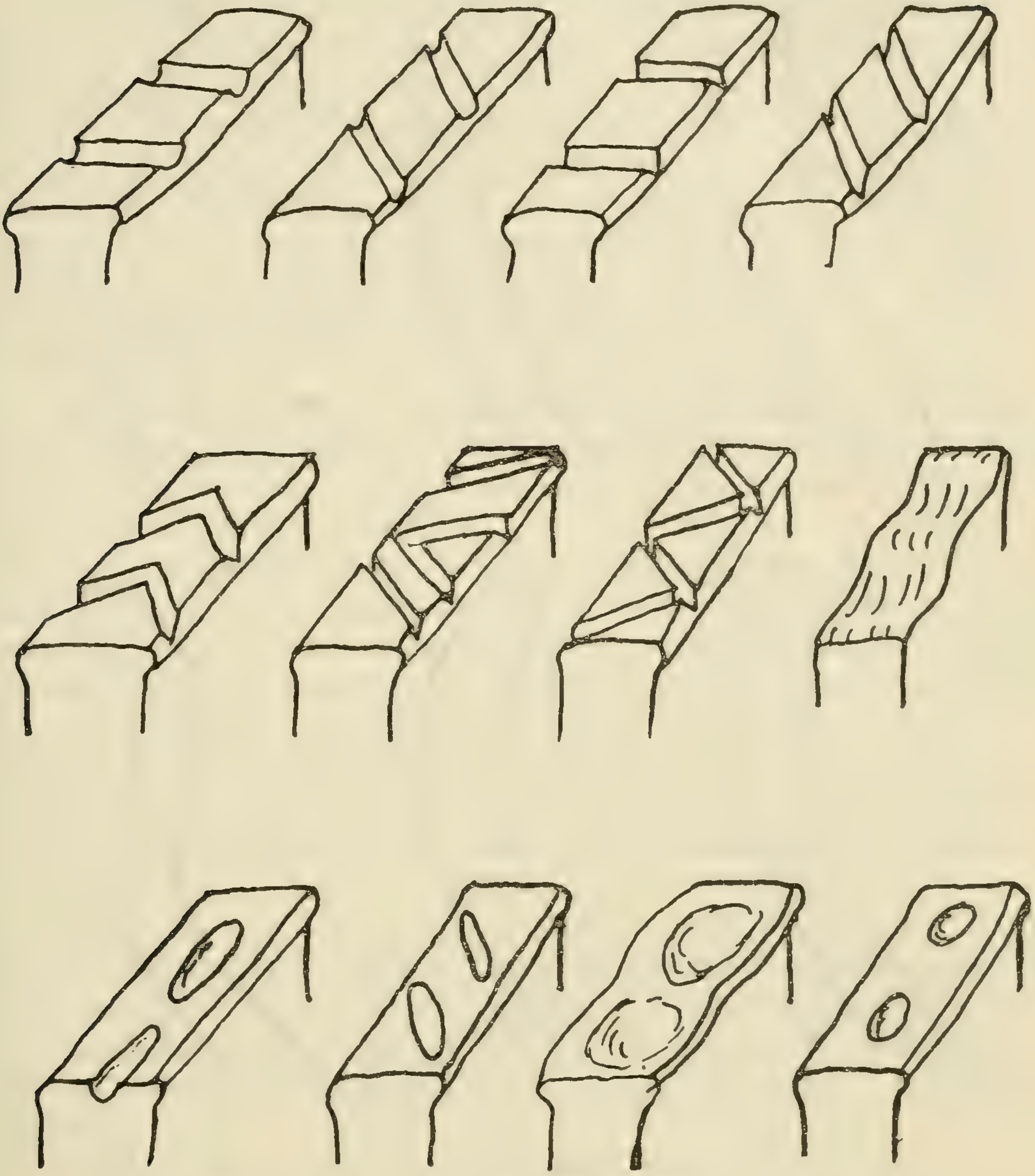


FIGURE 23.—Lip decoration of Dismal River pottery.

In general, the pottery from White Cat Village can be described as a buff to gray or black ware with a very gritty, fine-textured, compact paste, tempered with fine sand if at all. It tends to break perpendicularly to the surface along straight lines into very small pieces. The surface is smooth or simple stamped and decoration, when it occurs, is limited to the lip area.

WORK IN STONE

An abundance of worked and unworked stone was found at White Cat Village, especially on the surface. By far the greater part of the stone was yellow or brown jasper which occurs in many places along the Republican River.

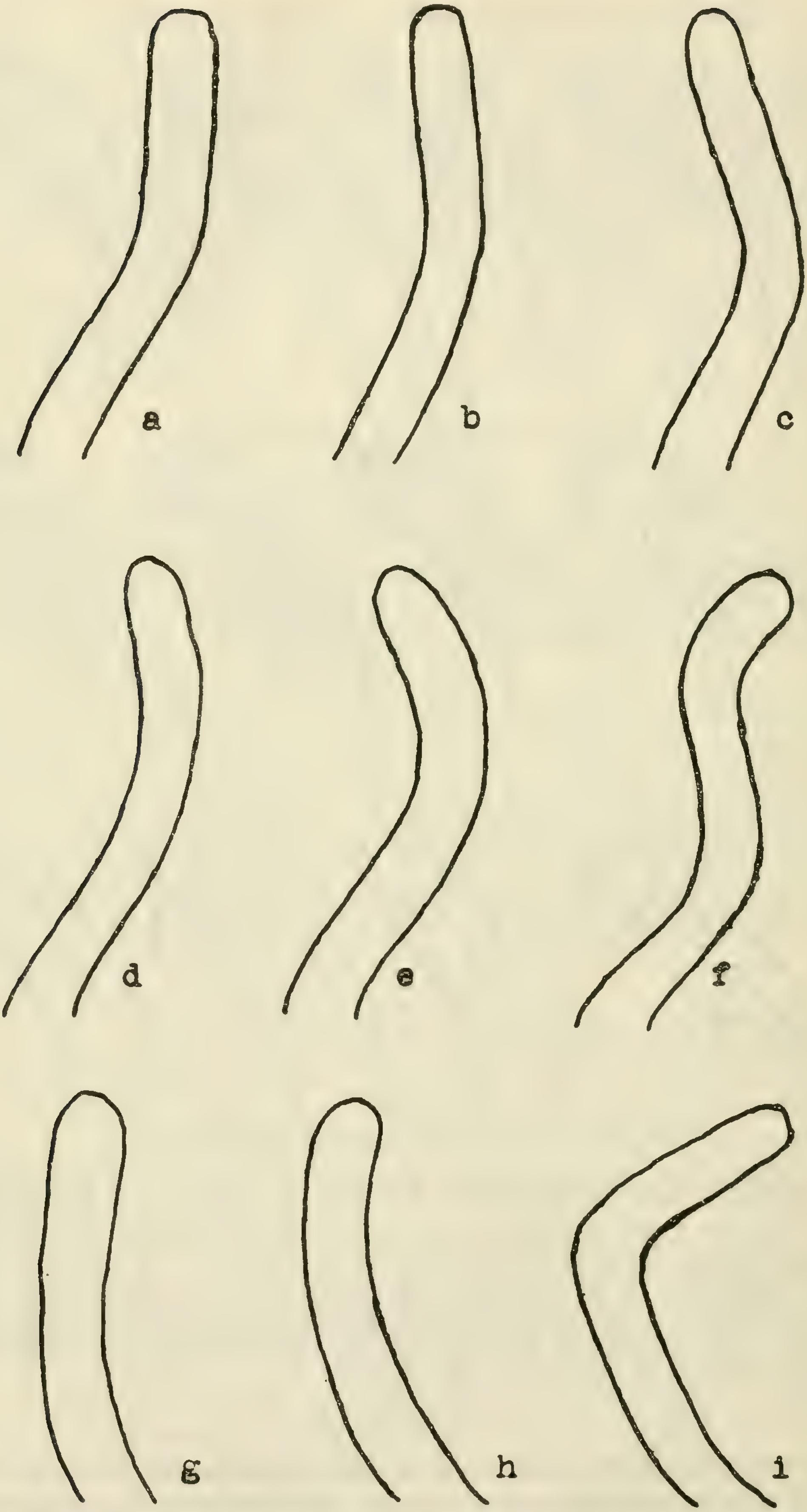


FIGURE 24.—Rim profiles of Dismal River pottery. (Inside of vessels to right.) *a–c*, Straight rims. *d–e*, Curved rims. *f*, Recurved rim. *g–i*, Bowl rims.

Flint or chert of light to dark gray was not uncommon, and a few pieces of white flint were also found. Much of the jasper and chert exhibits flaws and layers of limestone and other minerals, showing that the raw material had been secured from thin seams.

In addition to these materials, several other types of stone suitable for chipping were found. Two chips of obsidian, which is not native to the area, and a chipped piece of crystal quartz were found. One artifact, a projectile point, was made from a white, black, and yellow translucent material, probably chalcedony. One piece of mineralized wood fashioned into a side scraper was also found.

The workmanship on stone objects is characterized by a general crudeness which, on many artifacts, is sharply contrasted with a single, very finely chipped cutting edge. Projectile points in general were skillfully made. Thus it appears that the crudeness represented choice rather than lack of skill.

Pecked or polished stone was much less common than chipped stone. Two kinds of worked sandstone, very soft red Dakota sandstone and a somewhat harder, more firmly cemented, white or light-colored sandstone, were found. A few pieces of granitelike stone were collected but no artifacts of this material have been found. Small, irregularly shaped pieces of caliche, a fine, white, chalky material, were common. A few pieces of limonite and numerous bits of hematite were also found at the site. Only one fragment of catlinite was found.

Projectile points.—The projectile points from White Cat Village were made, for the most part, from the brown to yellow jasper which is found commonly in the Republican River Valley. A few specimens were made from flint varying in color from gray to nearly white, and one point was worked out of a chip of black, white, and yellow chalcedony.

TABLE 8.—*Projectile points found at 25HN37*

Type	Number	Type	Number
NAb2	1	SCb2	1
NAb3	1	Other	2
NBa	24	Unclassifiable fragments	35
NBa1	6		
NBb	18	Total	122
NBb1	34		

Most of the points from White Cat Village (table 8) are triangular in shape, and can be classified readily as: NBa, NBa1, NBb, and NBb1 (fig. 21). These points might be considered as representing only two types, since the points of types NBa and NBb represent a smooth series rather than two distinct groups (pl. 12). The same thing is true for those points of types NBa1 and NBb1 (pl. 12).

The complete points of types NBa1 and NBb1 vary in length from 1.7 to 2.7 cm. and in width from 1.0 to 1.5 cm. Only one of the broken points appears to have been appreciably larger. Except for this one, the points form a single continuous series although the larger points present a more slender appearance. The chipping was uniformly well done. The one large specimen mentioned above was represented by very little except the base and notches and is so little like the others that it seems intrusive in the Dismal River complex.

The complete points of types NBa and NBb vary in length from 1.9 to 2.8 cm. and in width from 1.1 to 1.6 cm. The smaller points, in general, seem to be relatively thicker and show less uniformly precise chipping than the points of types NBa1 and NBb1. Many of the smaller points are, however, made equally well. Seven points of type NBa fit poorly into the series with the rest of the triangular unnotched points. They are all broken but appear to have been larger than those forming the series. Many of these larger points appear to have been triangular flakes with neatly retouched edges and may have served as small knives rather than as projectile points. Some show only unilateral chipping except for the retouched edges.

One point of type NAb2 (pl. 12, *n*) is nearly complete. This specimen is 1.5 cm. long, 0.8 cm. wide, and shows very precise, uniform chipping. The NAb3 point is well made although incomplete (pl. 12, *p*). The part found is only 1.8 cm. long and about 0.9 cm. wide, but it may have been about 2.5 cm. long originally. Both points are considered aberrant.

The point of type SCb2 (pl. 12, *m*) is 2.6 cm. long and 1.6 cm. wide and delicately chipped from brown jasper. Two other points are discussed separately because they are not readily classifiable (pl. 12, *o*, *q*). One of them was somewhat leaf shaped with a flat base and notches. This point is 3.6 cm. long and 1.8 cm. wide, with a pronounced twist. The other point is a stemmed and shouldered point with a flat base. The base is 3.5 cm. wide and 5.0 cm. long with probably 1.0 to 1.5 cm. of the point missing. These two crude points are aberrant.

Drills.—Drills of two types were found at White Cat Village. The more common is the so-called "cigar-shaped" drill, although expanded base drills were not rare. The midsection of a double-pointed drill with projections on either side of the center was found (pl. 14, *e*.)

Cigar-shaped drills (pl. 14, *f*, *g*) were made from prismatic flakes of jasper, generally triangular or ellipsoidal in cross section. One or both ends came to blunt points and many drills have a slight taper for the entire length. The maximum diameter of holes drilled with such tools would vary from about 0.9 cm. to about 2.4 cm.

The smaller drills tend to be more neatly chipped than the larger ones and some are much smoothed or dulled, probably from extensive use in hard or abrasive substances. Most of the drills are represented by sections only. However, two complete drills which showed evidence of much use are 5.5 and 5.1 cm. long by 1.0 cm. and 1.1 cm. in maximum diameter respectively. These drills are somewhat smaller, at least in diameter, than the average for all drills from the village.

The expanded-base drills (pl. 14, *a–d*) are represented by 1 complete and 14 broken specimens. The shafts of these drills were smaller than those of the cigar-shaped drills. The maximum diameter of 13 expanded-base drills was between 0.6 and 0.8 cm.; the other two were about 1.0 cm. in diameter. The shafts were approximately rhomboidal in cross section and tapered gradually to a reasonably sharp point.

The expanded base, or the portion that would be grasped, was sometimes left unfinished, but some shaping was done in most instances. In a few cases, the base had been finished to a smooth knob. The expanded-base drills do not show the dulling noted on some of the cigar-shaped drills. Two other larger crude tools (pl. 14, *h, i*) also appear to have been used for drills.

Knives.—Well-made knives are rare at 25HN37. As mentioned before, a few triangular points were of a size better suited for use as knives than for use as projectile points. On these points the chipping was delicate and evenly executed from one or both surfaces.

The only other examples of extremely fine chipping occur on the edges of random flakes which vary in length from 2 to 7 cm. and appear to have initially had sharp edges. The chipping is usually from one face only, but is not restricted to a single edge or to straight edges, occurring rather wherever an edge is relatively thin and tapered.

It is often difficult to decide which of these artifacts were deliberately chipped and which show only use retouch. In many cases the edge probably represents a combination of both. There appears to be an even gradation starting with these thin flakes with very fine chips removed by use from one face, through thicker and thicker flakes with more extensive chipping, until the artifacts are definitely scrapers.

Five knives from the site form a series varying from roughly oval to almond shaped. These were relatively thick and showed very little pressure retouching. The four complete specimens (pl. 16, *a–d*) were from 3.7 to 5.5 cm. in length, 1.6 to 3.8 cm. wide, and from 0.8 to 1.4 cm. thick.

Of the artifacts recovered, at least one and possibly another represent portions of knives with alternately beveled straight blades. The chipping is well done but the sections of the artifacts are so small that little more can be determined about them.

The only well-chipped large blade found was represented by a small midsection. This knife showed uniform and well-executed percussion and pressure flaking. The edges were nearly straight, but not quite parallel. The width of the section varies from 3.8 to 4.0 cm.; it is 2.5 cm. long, and 0.8 cm. thick in the center. It is symmetrical in cross section.

One other knife is worth special mention (pl. 16, *d*). Although this was not finished all over, it does possess a fine edge showing a uniform curve. The blade has been formed by the skillful removal of large flakes from both sides by percussion. A few small flakes had been removed by pressure from one side only. It is somewhat oval in shape with one straight edge, and is about 0.5 cm. by 7.5 cm. and about 1.7 cm. thick. Except for the high quality of chipping it could be classed with the crude choppers since it has the same general shape.

Choppers.—At 25HN37, crude stone blades or choppers were common. Many of these were made from thin slabs of jasper from which the cortex had not been entirely removed. They appear to have been crudely roughed out by percussion chipping and only rarely given a well-shaped edge by pressure flaking.

One of the more common forms represented at this site is roughly rectangular to oval; chipped from both sides of one long edge and on one or both ends. The opposite edge is usually square. Six complete or nearly complete specimens (pl. 18) range from 8 to 18 cm. long, 4 to 6 cm. wide, and 1.2 to 2.0 cm. thick. In addition to the 4 nearly complete choppers of this form, 16 broken sections appeared to be portions of very similar artifacts.

A second type of chopper is much like the first except that all edges have been chipped (pl. 18). Only 2 complete choppers of this type were found, but 19 broken specimens were quite similar. This group apparently has about the same range in size as the first group described.

Five other complete or partial choppers showed unilateral chipping. Except for this, they are comparable to the others.

The use to which these choppers were put has not been determined. Most of them show much battering on one or more cutting edges. It would appear that many of them were used for hacking some hard material such as wood or bone.

Scrapers.—Scrapers were the most common artifacts found at 25HN37. They were strictly utilitarian as is most Dismal River stonework. Generally speaking, these artifacts do not show much more chipping than is necessary to form a working edge. The pieces of stone from which the scrapers were made usually have one somewhat smooth surface. In most cases this surface is the result of a single spalling or fracture. Frequently the only chipping is that on the scraping edge which meets the smooth surface at an angle of about 45 to 80 degrees. Occasionally, however, a scraper is found which has been given an overall shaping and which represents careful workmanship. End scrapers (pl. 19) are most common but side scrapers (pl. 21) are also present. A few artifacts have scraping edges on more than one margin.

Usually the chipped edge is relatively thick although there seems to be a smooth gradation into flakes retouched to produce a cutting edge or showing use retouching. Other scrapers have a conventional snub nose at the scraping end combined with a thin, finely retouched cutting edge along another margin.

Another variation is represented by scrapers with graverlike projections on the edges (pl. 22). These tangs vary in size from sharp points to semicircular projections 1.5 cm. in diameter.

One interesting feature of the scrapers in general is that many of them have received much hard use, to judge by the damage done to the scraping edge. What was originally the cutting edge is often completely broken back. The size of end scrapers varies greatly: in length from about 2 cm. to about 8 cm., in width from less than 2 cm. to about 5 cm., and in thickness from about 0.5 cm. to about 2.5 cm. Most of the end scrapers, however, were between one and two times as long as they were wide, and seldom if ever thicker than wide.

Gravers.—Six specimens of worked stone from 25HN37 had little particular form except for small sharp projections (pl. 11, *d-f*). These appear to be deliberately chipped, usually from only one surface. These artifacts have been classed as gravers. As mentioned above, a few scrapers from the site also appear to have graver points chipped at some convenient place.

Abraders.—Sandstone abraders, usually shaft polishers (pl. 23, *a-c*), were common at 25HN37. Most of them were made of very loosely cemented red Dakota sandstone. One specimen was made of white sandstone.

Twenty-nine sections of grooved abraders, as well as many smaller pieces which could be abrader fragments, were found. There were no complete abraders, but several were sufficiently complete to determine the approximate width and thickness. These abraders varied in size from 1.5 cm. thick by 3.0 cm. wide to 2.6 cm. thick by 5.0 cm. wide. The depth of the grooves varied from about 0.1 to about 0.4 cm. Two fragments, possibly of the same specimen, had grooves in two faces.

Two sections of shaft polishers, although they were not found together, are so much alike that they could represent a pair of abraders which had been used together. These sections have nearly identical outlines, and when they are placed with their smooth sides together the grooves are alined.

In addition to these deliberately shaped artifacts, unshaped pieces of sandstone have been found which show random grooves. These, also, probably served as abraders.

Pipes.—One small fragment of catlinite found at 25HN37 appears to be a fragment of a pipe. The outer surface was well smoothed and the inner surface very rough. The specimen was 0.3 cm. thick and indicates that the pipe would have been somewhat square with rounded corners. A red stone pipe is reported to have been found at the site by a neighboring farmer.

Metates.—Only one specimen was sufficiently complete to be identified as a metate (pl. 23, *d*). This was a slab of red Dakota sandstone about 24 cm. by 15 cm. by 4 cm. thick. One surface was very rough, but the other side was fairly smooth and slightly concave. The center of this surface was about 2 cm. lower than the edges. About half of the specimen was found in House VI at floor level in the top of posthole A. The other half, which fits perfectly, was found on the surface and shows two deep scratches which look as if they had been made by farm machinery.

Caliche.—A number of small irregular pieces of caliche were found (pl. 11, *g-i*) which vary in average diameter from 7 cm. to 1 cm. All the pieces appear to have been smoothed and somewhat rounded by rubbing on a flexible surface. It is possible that this material may have been used in the smoothing and whitening of hides or as a white pigment for paint.

Hematite.—Hematite occurred in all parts of the site in the form of small specks in the village level mixture. In House VI, relatively large amounts of hematite were found in the fireplace and an area just south of the fireplace showed a rich mixture of hematite in a very dark stain. Usually the hematite was finely divided, but one lump which had been extensively scraped was found in House VI. The lump was 1.8 by 1.5 by 1.3 cm. It seems probable that hematite had been used as red pigment for paint.

Limonite.—Several pieces of soft, fine-textured limonite were also found. This material was soft enough and colorful enough to have been used as pigment for paint. One lump was found in House VI in the area rich in hematite just south of the fireplace. One lump found on the surface had a pit in one side and also showed evidence of having been scraped in two other places.

WORK IN BONE

Worked bone was uncommon at 25HN37 whereas unworked bone was common and sometimes well preserved. Since the Smithsonian party which surveyed the site secured nearly as much worked bone as the Laboratory of Anthropology, the material collected by both groups will be discussed in this paper. Bone artifacts from White Cat Village are listed in table 9.

TABLE 9.—*Bone artifacts from 25HN37*

Description	Number, Smithsonian Institution	Number, Laboratory of Anthropology
Tubular bone beads	3	3
Shaft wrenches		1
Metatarsus fleshers		2
Scapula digging tools	2	4
Fragments of worked scapulae		2
Eyed needle (?)	1	
Awls	3	2
Possible awls	3	2

Awls.—One rather blunt awl (pl. 26, *e*) and the fine point of another awl were found by the Laboratory of Anthropology. There was also found what may be the butt end of an even larger awl. An unfinished splinter of bone, one end of which is sharp and shows some polish on the broken surface, is a possible awl. The one complete awl (pl. 26, *e*) was 8.0 cm. long with a maximum diameter of 0.8 cm.

The Smithsonian Institution survey group recovered several other types of bone awls. Three blunt awls or punches, triangular in cross section and made of the edge of ribs, were found in a trash-filled pit, Feature 1. They varied in length from 6.8 to 7.8 cm. Two of them had the butt end rounded; the third had the butt end broken. The awls were smoothed and polished all over. The points of the three show considerable use and some indication of battering. None of them show any evidence of having been especially sharp, and one in particular appears to have come to a blunt point. They would hardly serve as awls in their present condition even though the preservation is good. They may have been discarded because they had become dull.

The Smithsonian group also found three splinter awls in the trash-filled pit, Feature 1. The one of these awls which is complete is 9.1 cm. long. All three splinter awls are narrow, none of them being more than 0.7 cm. wide. All three are sharp and show little evidence of dulling although the points appear to have become well polished through use.

Beads.—Three tubular beads (pl. 26, *a*, *b*) made from canis metacarpus or metapodial sections were found by the Laboratory of Anthropology at 25HN37. These beads varied from 3.9 to 4.8 cm. in length and from 0.5 to 0.8 cm. in diameter. They were fairly well finished and the cut ends show some evidence of polishing.

There is no evidence of their having been decorated. Beads found by the Smithsonian party are very comparable in size and shape.

Shaft wrench.—The Laboratory of Anthropology also found a fragment of a bison rib shaft wrench (pl. 26, *c*). The specimen was broken at the hole, which appeared to have been tapered from both sides and worn smooth.

Fleshers.—Both fleshers from 25HN37 (pl. 35) were found in the roasting pit. The articulated specimen was found in the fill of the pit whereas the other was in the top. The articulated flesher was apparently never completed. The metatarsus had been broken and partially split but not polished. Some work had been done on what would have been the cutting edge, but it had never been finished. The flesher made from a single bone had been nicely finished and most of the rough edges smoothed. The cutting edge was sharp and showed no evidence of ever having had teeth or serrations. Both specimens were made of bison metatarsi.

Scapula digging tools.—Only one of the scapula digging tools was complete. This specimen was 28 cm. long and 13 cm. wide (pl. 36, *b*). The articular end and scapula spine had been cut and broken away. The preservation is poor but the edge does show use. Two smaller but better preserved pieces of what were probably scapulae show polishing from use. The spines have been removed from these also. The fourth digging tool was badly broken but it also showed polish from use and showed no evidence of either the articular end or the spine. All are identified as bison. Other fragments of scapulae showed use but were too small to classify.

The Smithsonian Institution party recovered two portions of scapulae from a trash-filled pit, Feature 1. Both specimens have been worked and were probably sections of digging tools. The edge of one in particular shows considerable polish, probably from use.

Needle (?).—From the same pit, the Smithsonian party recovered a section of bone needle or band. The section, which is broken at both ends, is 6.5 cm. long, 0.5 cm. wide, and 0.2 cm. thick. The width and thickness is uniform over the entire length. This piece is curved, forming an arc about 0.5 cm. high with a span of 6.2 cm. It has been worked smooth and shows some polish on the outer surface, but shows no indication of either an eye or an encircling groove. The specimen resembles the eyed needle (?) from 25HO21.

WORK IN ANTLER

The Smithsonian Institution survey party found two antler tines in a trash-filled pit at 25HN37. Both appear to have been partially cut and then broken off. One of them has the tip broken off at an angle, possibly from use as a flaker or as some other tool. Both show some polish near the tip which may be from use or may be natural. These two tines are 14.2 and 13.7 cm. long. A shorter piece of antler tine was also found by the same Smithsonian Institution party. This specimen is 6.7 cm. long; it has been partially cut and then broken off. The very tip appears to have been slightly flattened and somewhat polished, and has not been subsequently broken or battered.

WORK IN SHELL

No specimens of shell from 25HN37 definitely showed work. One specimen which was rectangular may have been shaped, but it was so decomposed that tool marks were not discernible.

EUROPEAN TRADE MATERIAL

European trade material was uncommon at 25HN37. Three pieces of metal were excavated from House VI; the exact provenience was known for two of them. Five pieces of metal found on the surface may represent either material possessed by the Dismal River people or material lost more recently. Two pieces of chipped stone, believed to be gun flints, were also found on the surface.

Axes.—The most significant metal object found was the iron ax (pl. 37) recovered from the fireplace of House VI. The details of the find are described in the discussion of House VI. The overall length of the ax is 16 cm. and its weight is 1 lb. 9 oz. The blade is 9.8 cm. long, 7 cm. wide at the cutting edge, and 3.6 cm. wide where it attaches to the eye. The blade is 2.2 cm. thick where it attaches to the eye and thins evenly to within about a centimeter of the cutting edge, from which point it thins more rapidly. The cutting edge of the blade is curved and the entire blade is set at a slight angle to the eye and, hence, to the handle.

The eye is not quite round and is tapered, being smaller toward the handle. It is 5.1 cm. by 3.2 cm. at one end and 4.4 cm. by 3.1 cm. at the other end. The longest diameters are in line with the blade. The eye is 4.2 cm. long at the side where the blade attaches and 4.6 cm. long at the other side. The thickness of the iron comprising the eye is about 0.7 cm.

The ax appears to have been made from a single piece of iron, doubled to form the eye and then welded together to form the blade. This would leave the blade laminated with a welded seam the full length of it.

The ax resembles closely those identified by Woodward (1946, pp. 6–7) as camp axes or belt axes. These, he believes, were evolved in the latter part of the 17th or the first part of the 18th century. The ax from White Cat Village is probably of French or English origin because these groups commonly traded such weapons to the Indians whereas the Spanish rarely if ever did (Woodward, 1946, p. 33). The ax closely resembles one found at 25DK5, which is in the collection at the Laboratory of Anthropology, University of Nebraska.

Jingles.—A jingle (pl. 38, *c*) made of thin sheet brass was found in the loose dirt of House VI. The specimen appears to have been neatly made, although it was badly broken when found. The part remaining is 2.5 cm. long and seems to have been conical in shape with a greatest diameter of at least 0.8 cm. The diameter of the opening at the small end is about 0.1 cm. A few small fragments of red hematite were found in the jingle. The workmanship would suggest that the jingle was not of Indian manufacture. A piece of sheet copper (pl. 38, *d*) was found on the floor of House VI. The piece was 3.4 cm. long and from 1.5 to 2.0 cm. wide. It had been bent so as to form a nearly closed ring with diameters of 0.5 and 1.5 cm. The workmanship is crude and might represent an Indian's attempt to make a jingle from such raw material as a copper kettle. A smaller, somewhat conical piece of sheet brass (pl. 38, *e*) was found on the surface. The specimen is 1.2 cm. long with diameters of 0.8 and 0.3 cm. at the large end. A piece of sheet brass 2.8 by 2.3 cm. was also found on the surface. The piece is irregular in shape and has been roughly cut. It is of about the same thickness as the small brass cone found on the surface and the bent piece of sheet copper found in House VI, all of which are thicker than the brass jingle found in House VI.

Three irregularly shaped pieces of iron were found on the surface. Two of these are about the right thickness to have been cut from iron trade hoes. The third piece of iron resembles the point of a knife. It is, of course, impossible to establish whether or not these belonged to the occupants of the village or whether they were lost later.

Gun flints.—One gun flint and what is probably another were found on the surface of the site. The one specimen was rectangular, 2.5 by 2.2 by 0.7 cm. thick and made of a translucent gray flint (pl. 38, *a*). Three of the sides were beveled and the fourth side showed much battering. The two faces are parallel. There is no doubt that this is a gun flint. The other specimen (pl. 38, *b*) was of a light caramel-colored, slightly translucent flint. It was 2.7 by 2.6 by 0.7 cm. thick with three beveled sides, one of which was curved. The two faces are parallel and the three beveled sides resemble the working edge of an end scraper. Each of these three sides shows a little battering. It seems quite likely that this, too, is a gun flint, especially since no other specimens made of such flint were found at the site.

FAUNAL REMAINS

The faunal remains from the 1948 excavations have been identified by Weldon Frankfurter (Champe, 1949, p. 289) and found to represent six kinds of animals (table 10) in addition to chicken and cow. These last two can be attributed to recent White occupancy, especially since they were found on the surface. A much smaller faunal collection was made in 1949, but these remains have not as yet been identified.

TABLE 10.—*Faunal remains from 25HN37, 1948*

Animal	Number	Identification
Bison	516	*Bison bison.*
Turtle shell and bone	151	
Shell	63	*Unionerus tetralasmus.*
Deer, white-tailed	57	*Odocoileus virginianus*
Beaver	39	*Castor canadensis.*
Dog or coyote	6	*Canis.*

One interesting observation concerning the faunal remains is that half of the beaver remains were either teeth (mostly incisors) or ramus fragments. The absence of horse bones is significant inasmuch as horse remains have thus far not been found at other Dismal River sites. The absence of fish bones is also of interest. However, since much of the bone was not especially well preserved, observations as to presence or absence in this case are not necessarily conclusive.

VEGETAL REMAINS

Very few vegetal remains were recovered at 25HN37 except for wood charcoal. A fragment of a black walnut (*Julga nigra*) shell was excavated from the floor level of the overlapping houses, Houses I and II. Several small, charred seeds were found in the fireplace of House IV. The seeds are probably legume, possibly *Trifolium.*[2]

The wood charcoal, recovered chiefly from the houses and the roasting pit, has been identified as "from hardwoods, hackberry, ash, and probably some oak." [3]

DENDROCHRONOLOGY

The charcoal from 25HN37 was examined by Harry E. Weakly, who made a chart showing the matching of the tree rings of these specimens with the master chart which he had constructed for the area near Broken Bow, Nebr. With regard to this chart, Weakly states: [4]

> This gives a rather good agreement with an outside date near 1723. Since there were a few specimens which had rings which appeared to be at or very near the outside I do not believe the date will be too far off.

The date of 1723 is compatible with the rest of the information concerning the site and the aspect. The presence of a small amount of European trade material at the site would substantiate such a dating.

---

[2] Identified by Dr. John F. Davidson, Botany Department, University of Nebraska.

[3] Weakly, Harry E., letter dated November 18, 1949.

[4] Weakly, Harry E., letter to James H. Gunnerson, dated June 14, 1950.

BURIALS

No burials that could be associated with Dismal River people have been found in the vicinity of 25HN37. The only human skeletal remains recovered from the site were two teeth found in the excavation containing Houses I and II, near the fireplace of House I.

SUMMARY

Investigations at 25HN37 have revealed a village that must be considered small in comparison with contemporary Plains agricultural villages father east, but probably a little larger or at least more compact than villages of agricultural groups who lived in the Dismal River area earlier. As an estimate, there were probably about 20 houses at the site, but the overlapping of at least two houses indicates that they were not all occupied at once. Further, the general paucity of village refuse suggests that there may have been repeated occupations of the site rather than a single prolonged occupation. Surface indications suggest, moreover, that houses tended to cluster at the two ends of the thousand-foot-long site with a possible gap in the middle.

The houses at 25HN37 had five vertical center posts arranged in a nearly regular pentagon and, in some cases, two posts indicating an entrance to the east. The fireplace was in the center of the lodge, whose living area was increased by the use of poles placed beyond and leaned against the central framework. The structure probably resembled a Plains earth lodge except that it was smaller, less deeply excavated, and may not have been earth covered.

One heavily fired roasting pit found at 25HN37, like those at 25DN1 and 14SC1, was presumably used for the preparation of food and later for the disposal of refuse. A few shallow trash-filled pits found at 25HN37 were neither as common nor as well defined as those at 25CH1 and 25DN1.

The pottery from 25HN37 is virtually identical with that found at 25CH1. It is buff to black in color, with a fine-textured, gritty, compact paste. Tempering, when present, consists of fine to medium-sized particles of sand. Rarely, mica is included. Decoration is uncommon and confined to the lips of vessels. Surfaces of sherds vary from smooth to sharply simple stamped. No restorable vessels were recovered from 25HN37.

Most of the stone artifacts from 25HN37 were made by chipping. End and side scrapers are the artifacts most commonly found. The projectile points from the site were well made and predominantly of types NBa, NBa1, NBb, and NBb1. Other chipped-stone artifacts were straight-shafted drills, expanded-base drills, knives, modified flakes, and crude choppers. Ground-stone artifacts consist chiefly of sandstone abraders. The chipped-stone artifacts from 25HN37, other than projectile points and drills, are utilitarian, characterized by a general crudeness, with precisely chipped working edges occurring often on otherwise roughly shaped artifacts. Very little emphasis was placed on conserving stone. This might be explained by the presence of outcrops of brown jasper in the vicinity, furnishing readily available raw material.

Work in bone is much less common than work in stone at 25HN37. This can be attributed only in part to poor conditions for preservation, since some worked and unworked bone is well preserved. Bone artifacts found at the site consist of metapodial fleshers (not serrated), scapula digging tools, awls, and beads. Specimens of worked antler were rare and no specimens of shell had been worked.

Several items of probable European origin were found at 25HN37. The most significant of these was an iron ax, which had been driven into the fireplace of the burned house. The ax is probably of French or English origin. Copper and brass jingles were found both in excavations and on the surface. This trade material suggests a dating of about 1700.

Faunal remains were abundant at White Cat Village. Most of these remains were identified as bison, but beaver, turtle, canis, and deer were also found. The abundance of faunal remains and skin-dressing tools and the scanty evidence for the growing of crops indicate that the subsistence pattern of the Dismal River people, even in this location so favorable for farming, emphasized hunting over agriculture.

A date of 1723 has been established for the site on the basis of dendrochronological investigations by Harry E. Weakly. This indicates an occupation only slightly later than that at other Dismal River sites dated by the same method.

SITE 25HN44

Site 25HN44 is located about 2 miles southeast of Republican City, in Harlan County, Nebr. The site was originally investigated by the University of Nebraska, Laboratory of Anthropology, in the summer of 1948. At that time only the southern portion of the site was examined, and the artifacts recovered from the surface indicated that it was almost exclusively Upper Republican. In the spring of 1950, a small group from the University of Nebraska, Laboratory of Anthropology, revisited the site and found that the northern part of the site yielded Dismal River pottery. The few pieces of Dismal River pottery found during this later brief visit are all smooth but correspond very closely to pottery from White Cat Village.

This site is located on a fairly high terrace above what appears to be an old meander bed of the Republican River, and is about one-half mile north of the present stream channel. There may, however, have been a spring or small stream in a small valley or draw just below the site.

SANDHILLS SITES

INTRODUCTION

The investigation of sites in the potential Mullen Reservoir area has greatly increased knowledge of the Dismal River Aspect in the area where it was first identified. A reconnaissance of this area, which is located in the valley of the Middle Loup River, just below Mullen in Hooker County, Nebr., was made in May 1947 by Marvin F. Kivett for the Smithsonian Institution's Missouri River Basin Survey. In the summer of 1949, Kivett returned to the area with a party from the Nebraska State Historical Society, a cooperating agency, to conduct salvage archeology. Five Dismal River sites within the potential reservoir were investigated. Three of these, 25HO21, 25HO7, and 25HO24, were tested intensively, while 25HO5 and 25HO9, less significant sites, received only surface reconnaissance.

Excavation at these sites probably represents the first controlled archeology conducted in the Sandhills region, where excavation has previously been considered impractical, and where most information has come from surface or "blowout" finds. Kivett has demonstrated that such features as postholes and pits can be found in this extremely sandy soil. Further, he has provided data on Sandhills manifestations of a group also represented by sites located in more ecologically favorable areas. Thus it becomes possible to discuss within the limits of the data the effect of changes in environment on the material culture of the Dismal River people.

ENVIRONMENTAL SETTING

Hooker County is in the middle of the Sandhills which cover a large portion of west-central Nebraska. The terrain is gently rolling dune sand, stabilized for the most part by bunchgrass, but with active blowouts and a few drifting dunes. The county is traversed by the Middle Loup River, which flows through a narrow but fertile valley, and by its tributary, the Dismal River, with a still narrower valley. Older rivers have become choked with sand, forming small lakes and marshes. Trees are found only along the streams, where wild fruit also occurs. Primitive agriculture could have been practiced in some places along the Middle Loup. The area between the rivers has enough grass to support a limited number of animals and, although the area could not have supported large herds of bison, it is probable that there was always a fair amount of game available, since the clear streams and springs provided an excellent water supply throughout the year. The region has an average of 140 frost-free days per year. The annual average rainfall is 20 inches, most of which falls from April through August (Rice, 1914).

SITE 25HO1

The sites on the Dismal River in Hooker County, Nebr., from which the Dismal River Aspect received its name, were investigated by A. T. Hill as early as 1920 and were later described by W. D. Strong (1932, pp. 152–155; 1935, pp. 212–217). The sites designated by Strong as D1, D2, and D3 have since been renumbered 25HO1, 25HO2, and 25HO3 respectively. In addition, the area at the forks of the Dismal River between the two branches, where Strong reports finding a little material, has been given the number 25HO4. The legal descriptions of these sites are on file at the Nebraska State Historical Society and the Laboratory of Anthropology at the University of Nebraska.

Site 25HO1 is located on the south bank of the Dismal River, 8 miles west of Seneca, Nebr. The pottery from this site (Strong, 1935, pp. 215–216) was described as thick, "hole tempered," and ridged on the outer surface. It was later identified as Woodland rather than a variant of Dismal River pottery. Since then, however, Dismal River pottery has been found at the east end of this site.

The Nebraska State Historical Society has a small surface collection from 25HO1. The sherds are all very small and somewhat sand blasted. Both Woodland and Dismal River sherds are represented. The Dismal River sherds are dark buff to gray-black and usually have smooth surfaces. One rim sherd has a smooth, rounded lip. Several kinds of stone were represented at the site, including quartzite, jasper, chalcedony, obsidian, flint, and river boulders. Very few stone artifacts are included in the collection.

SITE 25HO2

Site 25HO2 is located along the south bank of the Dismal River just below the forks. The level of the site is considerably above the level of the river, the ascent being steep. Carl Humphrey of Mullen found several porcelain beads at this site.

The Historical Society's collection from 25HO2 is small, consisting of a Dismal River sherd and a few small chips of jasper, chalcedony, quartz, and quartzite. The sherd has a smooth, buff surface with an almost waxy feel.

SITE 25HO3

Site 25HO3 is probably the largest of the three sites along the south side of the Dismal River. It is located about 4 miles southwest of the forks of the Dismal River on the south bank of the south branch, or about 15 miles south of Mullen, in Hooker County, Nebr. The site is located on a high terrace overlooking the stream and is now dissected by large, deep gullies. In addition, the surface shows evidence of severe wind erosion, but when the site was visited in 1949, much of it had grassed over and only one large blowout at the east end of the site was still active.

The Historical Society's collection from 25HO3 consists of a few Dismal River sherds, numerous stone chips, and a sheet-iron jingle. The sherds are buff to gray black, small, and sand blasted. The paste is gritty and most of the sherds contain a moderate amount of fine to medium sand tempering. The surfaces are generally smooth; only a few show simple stamping. One sherd shows a few closely spaced, shallow punctates about 0.5 by 0.3 cm., apparently in rows. The jingle is 2.5 cm. long and 0.9 cm. in greatest diameter. Chips and pieces of jasper, chalcedony, quartzite, obsidian, schist(?), and other stone were common in the collection from the site but stone artifacts or even pieces showing work are relatively rare. These consist of a few fragments of projectile points and a piece of obsidian which appears to be a point of a drill.

Strong (1935, pp. 214–215) describes blackened, hard-packed areas from around which the soil had blown. These he interpreted as hearths. Also at this site he noted what may have been the remains of an earthen wall. Strong thought that this might represent the remains of the "breastworks" referred to in the Omaha legend which designated the forks of the Dismal as the place "where Padouca built breastworks" (Fletcher and LaFlesche, 1911, p. 91).

SITE 25HO5

Site 25HO5 is located on the south side of the Middle Loup River about 8 miles east of Mullen, in Hooker County, Nebr.

The Smithsonian Institution has a small collection obtained by the River Basin Surveys from 25HO5, including five very small dark-gray sand-tempered Dismal River sherds, several pieces of worked stone, end and side scrapers, fragments of projectile points, and modified pieces of stone, as well as several pieces of unworked stone and chips.

The Nebraska State Historical Society also has a small collection from the site. This consists of a small amount of worked and unworked stone and a few fragments of bone, along with one small split sherd. The sherd is buff with a smooth surface and could be Dismal River.

SITE 25HO7

INTRODUCTION

Site 25HO7, the Lowe Site, is located about 1½ miles north and a mile east of Mullen, in Hooker County, Nebr. The site was surveyed by Marvin F. Kivett in May 1947 for the Smithsonian Institution, River Basin Surveys. In the summer of 1949, Kivett, with a party from the Nebraska State Historical Society, made further tests at the site. The data obtained are on file at, and were made available by, the Nebraska State Historical Society.

A series of 10-foot squares was excavated along the terrace face, from which cultural material had eroded. The terrace was 10 to 12 feet above the alluvial plain along the river and about 150 to 175 feet south of the channel of the Middle Loup River. Just south of the site, the terrain slopes abruptly upward.

The cultural zone was dark, charcoal stained, and about 0.8 foot thick. It was overlaid with 2.2 feet of banded overburden which was chiefly sand or clay or a mixture of the two. A charcoal-stained humus layer 0.6 foot thick was found 0.6 foot below the surface of the ground.

No definite evidence of house structures was observed at this site. One fireplace was found but no associated postholes were located. The fireplace was 20 inches across, 8 to 10 inches thick, and consisted of from 2 to 5 inches of white ash overlying 3 to 4 inches of red sand with some charcoal fragments. The fireplace was considered by Kivett (MS., 1949) to be associated with two trash-filled pits.

A hearth area, located 75 feet east-northeast of the fireplace, consisted of very black sand well mixed with ash, charcoal, and limited amounts of burned earth. The area was 14 by 16 inches and 8 to 10 inches thick, and showed some evidence of having had a prepared basin; the walls, however, showed very little burning. The basin extended from 2 to 4 inches below the general village level.

Trash-filled pit No. 1 was 26 by 30 inches and extended 12 inches below the cultural zone. The fill consisted of charcoal-stained sand well mixed with white ash, broken pottery, animal bones, and stone. A gully had cut into the pit and some ash and bone had washed down the slope.

Trash-filled pit No. 2 was 36 by 30 inches and 12 inches deep, and contained charcoal-stained sand, a little white ash, worked and unworked bone, stone and pottery sherds.

POTTERY

Site 25HO7 yielded 39 rim sherds sufficiently well preserved to indicate lip form. Twenty-one had undecorated lips. The lips varied from slightly thinned to considerably thickened and from flat to rounded (fig. 22). The thickening on some was confined to the portion immediately below the lip, whereas on one the rim was thickened for the upper 2.5 cm. Rounded lips are more common in this group than are flattened lips. A few lips were somewhat roughened but showed no decorative motif.

The decorated lips (fig. 23) are generally thickened and frequently flat. The most common decorative motif from this site (on seven sherds) consists of elongated punctates placed tangently on the lip. The punctates vary in length from about 1 to 2 cm. and are relatively far apart, the space between being at least as long as the punctate. Two of these rims were unusual for Dismal River pottery in that holes had been drilled through the vessel 1.5 to 2.0 cm. from the lip. The holes were about 0.3 cm. in diameter and had been drilled after the vessel was fired, possibly to lace together a crack.

A variant of the punctate motif consists of somewhat shorter but still elongated punctates placed diagonally in the lip, and spaced considerably closer together. Three sherds of this style were found at 25HO7. Four sherds with closely spaced lines impressed diagonally across the lip were found at the site.

Two uncommon styles of lip decoration were found at this site. One sherd had incised lines placed diagonally across the lip. At one place, the angle was changed drastically, leaving a V-shaped design with lines approximately parallel to either side of the V and progressing away from the respective sides. Three sherds had diagonally incised lines in the lip, superimposed by nearly radially incised lines. The ends of these two sets of lines met at common points along the outside edge of the lip.

Both simple stamped and smooth rims were found at the site. A few showed horizontal striations, probably tool marks left from the shaping or smoothing of the rim.

The body sherds from the site are not especially distinctive. Surface treatment varies from sharp simple stamping through nearly obliterated simple stamping to smooth, somewhat polished sherds. A few of the sherds have a slick, almost waxy feel. The few thick, smooth, buff to gray sherds found are very similar to the Dismal River pottery from Ash Hollow Cave. The range in thickness at 25HO7 would appear to be the same as at 25HO21. No heavily micaceous sherds and only a few containing traces of mica were found at the site.

The pottery is fine textured and gritty. Tempering ranges from no additional tempering material to moderate amounts of fine sand with an occasional inclusion of a larger particle. The paste is compact and appears to have been well worked. It is less granular than that from White Cat Village and is almost identical to the pottery from 25HO21. The pottery is generally buff to dark gray or black with an occasional sherd that appears to have been reburned to a buff color. The sherds are usually the same color all the way through, but sherds with different-colored surfaces or with a core differing in color from the surfaces are not uncommon. Five buff sherds have one red surface which shows a little polish and appears to be the inner surface in each case. The paste, except for having the carbon oxidized out, is within the range of that of other pottery from the site. Several of the red sherds show simple stamping on the side opposite the red surface. A few sherds had just a suggestion of black paint on a lighter background, but no design could be determined and the color difference might have resulted from differential refiring.

One body sherd from the site showed some incised decoration (pl. 10, *d*). Approximately parallel lines had been incised from 0.2 to 0.4 cm. apart, and between some of the lines were single rows of very fine punctates irregularly spaced. Some of the lines were partially obliterated, probably from handling or working with the pot while it was still soft. The two surfaces of the sherd are gray whereas the core is buff. The paste appears identical with that of the other pottery from the site.

Several fragments of pottery pipes were found, including one which had been part of an elbow-shaped pipe. The bowl had been 0.3 cm. thick and probably less than 2 cm. in diameter. This particular fragment was from the portion of the bowl near the stem and included part of the curve where the bowl joined the horizontal part of the pipe. Another fragment appeared to be the point at the outside of the curve of an elbow pipe. The other pipe fragments are not identifiable as to type.

WORK IN STONE

There was only a moderate amount of worked stone from 25HO7. The points from the site were made of chalcedony, brown jasper, and gray flint and are listed by type in table 11.

TABLE 11.—*Projectile points found at 25HO7*

Type	Number	Type	Number
NBa	2	Undeterminable	1
NBal	1		
NBb	3	Total	7

Five knives, all showing chipping from both surfaces, were found at the site; four were made of chalcedony and one was made of brown jasper. One of the chalcedony knives was diamond shaped with two adjacent sides much longer than the other two. The brown jasper knife was somewhat leaf shaped although not symmetrical. A small fragment of what may have been a quartzite knife was also found. Several flakes showed some retouching and were probably also used for knives.

Only one large, crude chopper was found. It was made of quartzite, had been chipped from only one surface, and the edges showed some battering, probably from use. The most common stone artifacts from this site were end and side scrapers. As at other Dismal River sites, there is frequently a scraping edge chipped on an otherwise unworked piece of stone. Sharp edges of several scrapers have been used for cutting, as shown by use retouching.

Three pieces of light-colored sandstone which show use as abraders were also found at the site. All three appeared to have been portions of shaft smoothers. One bell-shaped hammer or grinding stone with a flat surface showing evidence of considerable use was found. Unworked stone, especially such as would be easily flaked, was relatively uncommon at this site. This, together with the general low quality of some of the material from which artifacts were made, suggests that stone was difficult to obtain.

WORK IN BONE

Worked bone was not abundant at 25HO7. Two scapula fragments, one showing considerable use, probably as a digging tool, were found. Two awls made of bone splinters were found. One was of the broad, flat type made from a split rib; the other was much narrower and showed no work except at the point. One complete and two partial awls or punches triangular in cross section were also found. The complete one was 6.2 cm. long. Two bone beads also were recovered from this site. One of them was 5 cm. long, 0.6 cm. in greatest diameter, and of almost uniform diameter for the full length. Both ends were smoothed. The other bead was broken but had been made from a relatively short bone with large articulations. A hole had been drilled through one articulation and into the hollow portion of the bone. The other end is broken. The minimum diameter of the portion left is 0.5 cm. and the maximum is 1.1 cm. An articular end of a bison long bone had been cut off but showed no other indication of having been worked.

WORK IN SHELL

A piece of shell which seems to have been worked was found at the site. The specimen was 2.2 cm. long and 0.3 cm. thick. The cross section was square.

TRADE MATERIAL

A small, unidentifiable piece of iron was also found at the site.

SITE 25H09

Site 25HO9 is located about 3 miles east and a little north of Mullen, in Hooker County, Nebr. The Historical Society has in its collections from this site several small, sand-blasted Dismal River sherds. They are generally dull buff to gray-black. The paste is gritty and usually contains little or no tempering. Tempering, when present, consists of small amounts of medium-sized sand. Smooth sherds seem to predominate over simple stamped sherds.

A few chips of jasper, chalcedony, and quartzite are included in the collection from this site.

The Smithsonian Institution Missouri Basin Project has a small collection from the site consisting of several small sherds, a little unworked stone, one type NBa1 projectile point, and what appears to be a fire-spalled rubbing or milling stone.

SITE 25HO21

INTRODUCTION

The Humphrey Site, or, as it is sometimes called, the Matthews Site, is located on the south bank of the Middle Loup River about 5 miles east of Mullen, in Hooker County, Nebr. The site was located by a survey party of the Missouri Basin Project of the River Basin Surveys, Smithsonian Institution, in the spring of 1947. It had been known previously to local collectors. Marvin F. Kivett, who was in charge of the survey party which located the site, returned in the summer of 1949 under the auspices of the Nebraska State Historical Society. Kivett, under the direction of A. T. Hill,[5] with a small party, spent several days testing the edge of the site which had been badly gouged by graveling operations. The Nebraska State Historical Society has made the artifacts collected and the records of the excavation available for study. The site was visited by the author in the summer of 1949 but not until excavation had ceased.

The site is located on a terrace about 20 feet above the flood plain of the river and has only recently been cultivated. The village area extends away from the river up a slight smooth slope and is estimated by Kivett to be about 300 feet in diameter.

---

[5] This was the last site dug under the direction of the late A. T. Hill, former director of the Nebraska State Historical Society Museum.

The occupation level is covered with 1 to 3 feet of sandy soil which was topped with a good stand of native grass at the time of excavation.

Excavation was confined to the edge of the terrace at the request of the landowner.

STRUCTURES

Postholes, fireplaces, and what appeared to be lodge floors were found at the Humphrey Site. However, the postholes failed to form a definite pattern around a fireplace. The floors were represented by heavily stained areas and concentrations of village detritus. One area was covered by a layer of clay 1 to 2 inches thick which may have been brought in to form a floor covering. Also, charred timbers and twigs found at floor level may have been part of structures. In at least one instance, a posthole was found to contain a vertical bison long bone section, presumably used to tighten a loose post. Some of the postholes contained rotted wood. The fireplaces appeared as black burned areas containing much carbon. The rings of red burned earth which indicate fireplaces in less sandy areas were not present at this site.

PITS

The most significant features of the site were pits with a dark fill usually containing village detritus and artifacts. The sizes of the pits are given in table 12. Some of the pits were found at village level, whereas others were not detected until the village level had been removed and the dark fill was observed against the light-colored soil below.

TABLE 12.—*Trash-filled pits from 25HO21*

Feature No.	Diameter E-W (inches)	Diameter N-S (inches)	Depth below village level (inches)
2	72	87	20
3	60	42	18
5	42	38	12
7	72	48	24
8	40	36	14
10	30	33	12

Another pit found at the Humphrey Site was considered by Kivett to represent a roasting pit or basin. The pit was about 48 inches in diameter, 12 inches deep, and contained an abundance of white ash, charcoal, and burnt earth as well as some river pebbles.

An oval concentration of sandstone pebbles with one quartz pebble covered an area 12 by 14 inches and was from 4 to 6 inches thick. The stones show considerable burning and may represent a hearth area. The stones were surrounded by charcoal-stained sand, but no ash was found.

POTTERY

The pottery from 25HO21 corresponds closely with that from the Dismal River sites in southern Nebraska. The only differences are in the frequencies of various traits. Such differences seem too minor to justify the establishing of an additional focus, at least on the basis of pottery.

The paste of sherds from the site is fine textured and definitely gritty, but is slightly less granular and less gritty than that from White Cat Village. Gouging of the sherds with a steel probe leaves occasional white streaks as if some of the particles powdered under pressure, but does not divide the 25HO21 pottery into as discrete particles as it does the pottery from White Cat Village. The tempering in the pottery from the two sites is comparable. It varies from no tempering material in addition to the very fine grit in the paste to moderate amounts of fine sand with only occasional inclusions of particles 0.2 cm. or larger in diameter. Sherds containing mica in addition to sand are rare at this site.

Surfaces of sherds from 25HO21 vary from smooth and almost polished to deeply simple stamped. A few of the surfaces suggest simple stamping which has been almost obliterated by smoothing. Some of the pottery duplicates the relatively thick, smooth Dismal River pottery found at Ash Hollow Cave and in lesser amounts at a few other sites. This pottery is generally buff to gray with an occasional black sherd.

A sample of 100 body sherds from 25HO21 was selected at random and checked for hardness and thickness. The average thickness was 0.6 cm. with a range of from 0.3 to 1.1 cm.

The range of hardness of this same sample is given in table 13. The average hardness is about 4.5.

TABLE 13.—*Hardness of pottery sherds from 25HO21*

Hardness	Total number	Smooth	Simple stamped
2–3	7	7	0
3–4	21	9	12
4–5	34	19	15
5–6	36	14	22
6–7	2	1	1
Total	100	50	50

Simple stamped sherds tend to be harder than the smooth sherds. It is interesting to note that the softest sherds (hardness from 2–3) were all smooth. The paste of these seven sherds does not appear to differ from that of the other pottery at this site.

The 100 sherds checked for hardness and thickness and texture were also checked for surface treatment and found to be equally divided between smooth and simple stamped. An additional 150 sherds examined were found to contain 72 smooth sherds, 73 simple stamped, and 5 indeterminate. This verified the equal representation of the two surface treatments observed in the first sample.

The rim sherds from 25HO21 present a variety of types of lip decoration (fig. 23). Twenty-five of the sherds had lines either incised or impressed diagonally across the lip. The distance between adjacent lines varied from 0.3 cm. to 0.9 cm. Seventeen of these sherds had a thickened and somewhat flattened lip. There was no evidence of thickening at the lip on the other eight sherds.

Three rim sherds had parallel lines incised or impressed radially across the lip. The lines were spaced about 0.4 cm. apart and were from 0.1 to 0.2 cm. wide.

Two of the rim sherds had chevrons incised in the lip so that they pointed counterclockwise around the rim. The lip on one of these sherds was 1.3 cm. wide with the arms of the chevrons from 1.2 to 1.4 cm. long and spaced at about 2.2 cm. intervals. The second sherd with the chevron design had only one chevron. The lip was slightly thickened and was about 0.6 cm. wide. The arms of the chevron, which pointed counterclockwise, were about 0.4 cm. long.

One rim sherd had a thickened lip, somewhat beveled to the outside. On the beveled portion of the sherd were deeply incised opposed diagonals. The sherd was buff in color and had vertical striations on the outside of the rim.

Six of the rim sherds had elongated punctates placed on the lip with the long axis of the punctate oriented tangentially on the lip. Five of these six sherds had a flattened lip, the other had a rounded lip.

Four other rim sherds had lips decorated with punctates. One of these had punctates very close together. The punctates were about 0.4 cm. in diameter and the lip was 0.7 cm. wide. Another sherd had elongated punctates in the lip with the long axis of the punctates oriented radially. The other sherds had evidence of punctates in the lip but were so small that it was impossible to determine the nature of the design.

One rim sherd had broad shallow depressions across a slightly thickened lip. These depressions appeared to have been made by pressing the lip while it was yet soft with a finger or thumb. There was no space between the impressions.

Three rim sherds had thickened lips with the surface of the lip irregularly roughened. One of these appeared to have rows of three small depressions diagonally across the lip.

The majority of the rim sherds had no decoration on the lip (fig. 22). Of these, 66 showed flattening of the lip with little or no thickening. The next most common variant was represented by 28 of the rims. These showed flattening of the lip with very definite thickening. Such thickening was toward the inside of the vessel, or the outside of the vessel, as well as toward both the inside and outside.

One interesting rim sherd had horizontal ridges around the outside of the rim. The ridges were 0.6 cm. apart with the top ridge about 1.0 cm. from the lip. Another rim sherd, about 1.5 cm. thick, had two grooves spaced 0.9 cm. apart encircling it. The sherd was broken just below the lower groove so the shoulder area was not present.

One lug or ear was found at 25HO21. The specimen was 2.0 cm. wide, 0.4 cm. thick, and had projected 1.8 cm. from the vessel. It has seven finely incised parallel lines on what was probably the top of the lug and two parallel incised lines extending from the under side of the lug down on the vessel.

One specimen may be part of a loop handle but is so fragmentary that absolute identification is impossible. The piece is 1.2 cm. wide, 1.8 cm. long, and 0.6 cm. thick. The paste of both the lug and the possible handle is highly comparable to the paste of the other pottery from the site.

The Historical Society has one miniature pot fragment from the site.

Another sherd closely resembles the smooth, thicker Dismal River pottery found at Ash Hollow Cave, except that it contains some mica along with sand tempering. This particular sherd appears to be from a flat-bottomed vessel with outward-sloping sides. The portion of this sherd representing the bottom is 1 cm. thick and the wall portion was 0.9 cm. thick.

The Smithsonian Institution has in its collection from 25HO21 two sherds which are of particular interest. One of them is a rim sherd (pl. 10, *c*) from what appears to be a constricted orifice bowl with a definite shoulder angle. The lip is smooth and rounded. The most spectacular feature of the sherd is the incised decoration. Nearly parallel lines 0.4 to 0.5 cm. apart start at the lip and run straight down to the shoulder angle where they are met by other nearly parallel lines at an angle of about 150°. The orifice appears to have been 10 to 12 cm. in diameter. The shoulder area is about 2 cm. wide. The sherd is 0.6 cm. thick. The paste is gritty and quite compact, not unlike the paste of the rest of the pottery from the site. It contains a small amount of fine sand tempering. The outer surface of the sherd is black; the paste is a dark buff. The sherd shows a little tendency to split and to break along the incised line decoration.

A body sherd from the site has two nearly parallel, lightly incised lines about 0.9 cm. apart (pl. 10, *a*).

There are a few sherds from 25HO21 which show a suggestion of painting. One sherd shows dark parallel lines on a sherd with buff surfaces and paste. Although buff sherds are rare in Dismal River, the color in this case could be the result of refiring in an oxidizing atmosphere. Except for this and one other buff sherd with a dark core and a single poorly executed painted line, no design elements are observable. These sherds, which may be painted, might be southwestern sherds or show southwestern influence.

The paint on some of the sherds appears to have been either spattered or dribbled on. The painting, if it may be called that, occurs on both the inside and outside of the sherds and predominantly on smooth sherds but occasionally on simple stamped sherds. The painting always appears as dark, often definitely black, on a buff surface. One sherd has what may be an orange slip on the inside. The paste is buff, except for a very thin layer which is black, and shows some polish. Except for color, the paste is well within the range for the rest of the pottery from the site. Buff color is not of special significance when found in Dismal River pottery since the black pottery becomes buff when refired in an oxidizing atmosphere.

Only one aberrant sherd was noticed in an examination of the entire collection from the site. This sherd (H25HO21–1347) is very small but appears to be Upper Republican.

Several fragments of pottery representing about six pipes were found at 25HO21. A portion of the bowl of one pipe had been rectangular with rounded corners (pl. 11, *a*), and appears to have been about 2.5 cm. by 3.0 cm. The edge of the bowl was thickened to 0.5 to 0.7 cm. In the thinnest portion it was 0.2 cm. thick. The lip was flat and quite compact. It showed no tendency to crumble. A few of the fragments of other pipes had similar paste. The paste seems well within the range of that in the pottery from the site. About a centimeter below the lip, an overall checked design has been incised. Rows of parallel vertical lines have been incised over rows of parallel horizontal lines. The parallel lines vary from 0.3 to 0.5 cm. apart.

Another portion of a pipe bowl appears to have been from a platform pipe (pl. 11, *c*). The outside diameter of the bowl had been about 5 cm. and the inside diameter about 1.5 cm. This left a flat lip about 1.8 cm. wide with closely spaced incised lines about 0.3 cm. long along the outer edge and radially oriented. The outside of the bowl became smaller below the lip and the inside of the bowl became larger. Two centimeters below the lip, the wall of the pipe was only 0.7 cm. thick.

Several fragments appeared to be portions of tubular or "cloudblower" pipes. One flattened mouthpiece (pl. 11, *b*), probably from such a pipe, was 2.9 cm. wide and 1.4 cm. thick. About 1 cm. from the end of the mouthpiece the specimen starts to taper. The hole through the mouthpiece was 0.5 cm. in diameter. One fragment found with the pipe may represent part of the bowl. If so, the bowl would have been about 0.5 cm. thick and perhaps 2 cm. in diameter.

A fragment of another pipe indicates a flattened mouthpiece about 3 cm. across and 1 cm. thick. The paste of these two "cloudblower" pipes is gritty and much less compact than is pottery from the site. The pipes show a greater tendency to crumble and split, suggesting that the paste was less well worked than that used in vessels.

A keel-shaped pottery fragment which probably represents part of an elbow-shaped pipe was found with some other fragments that could be from such a pipe. One of the fragments is so curved that it may have been part of the inside of the curve of the elbow. The paste in these fragments is very similar to the paste in the "cloudblower" pipe fragments. Several other pipe fragments are too fragmentary to indicate original shapes.

The Smithsonian Institution has in its collection from 25HO21 a small pellet of pottery clay. The specimen is round, 1.3 cm. in diameter and 0.4 cm. thick in the center and thinner toward the edges. There are small lines across the edges of the object that may represent intentional decoration or merely cracks formed by the flattening of a ball of clay. The paste appears to be black with a light-colored mineral deposit on the surface.

WORK IN STONE

Stone, especially unworked stone, was relatively rare at 25HO21, owing, perhaps, to the scarcity of workable stone in the area. By far the greatest amount of unworked stone consisted of moderately fine-textured white sandstone, many pieces of which appear to have been concretions.

A great variety of stone had been used. Chalcedony, quartzite, brown jasper, and Bad Lands chalcedony were common, in a wide range of colors. A few pieces of light-colored flint and red sandstone, and rare pieces of crystal quartz and agate were also worked. A few fragments of waterworn pebbles had been broken and worked, and a few pieces of granite and quartz show evidence of having been pecked and polished. A fragment of obsidian and one of hematite were found.

A comparison of worked stone at 25HO21 with that from Dismal River sites in the southern part of Nebraska indicated limitations in both the size and number of stone artifacts at 25HO21, except in the case of sandstone abraders. The amount of unexploited workable stone recovered is also surprisingly small, although this might be due to the limited excavation and the lack of surface collections. The artifacts seem to show a little more care in chipping than those from White Cat Village. For example, there are fewer nondescript pieces of stone with fine working edges. The best workmanship at both sites is about equal; there tends to be less poor workmanship at 25HO21 than at White Cat Village. Further, the 25HO21 stonework is characterized by a lack of large, crude choppers, and by an abundance of scrapers.

All the types of stone represented by completed artifacts are represented by unworked stone or by the chips left from the manufacture of artifacts. This suggests that any trading in stone was in the form of raw material, rather than in the form of finished tools.

Projectile points.—The projectile points from 25HO21 are almost entirely triangular in outline. They have either straight or concave bases and may be either notched or unnotched. A tabulation of point types is given in table 14.

TABLE 14.—*Projectile points found at 25HO21* [1]

Type	Number	Type	Number
NAb2	1	SCal	1
NBa	11	Unclassifiable	15
NBal	5		
NBb	14	Total	57
NBbl	10		

[1] For point shapes, see figure 21.

The quality of workmanship on the points varies, but, in general, the notched points show the higher quality of chipping.

Drills.—Only five drills could be definitely identified. Four of these items (pl. 15) had been of the expanded-base type, but none was complete. The maximum diameter of the shanks varied from 1.6 to 1.0 cm. The original lengths of the shanks could not be estimated.

Only one specimen (pl. 15, *g*) of the cigar-shaped type reported from other Dismal River sites was found at the Humphrey Site. This specimen shows much use, resulting in smoothing of the cutting edge. The specimen is broken; only 2.7 cm. of the point was found. The drill, made of brown jasper, came to a rather blunt point and was 1.0 cm. in maximum diameter.

One specimen which may have been a drill (pl. 15, *f*) was about 5.0 cm. long with a rather blunt point. It was 0.8 cm. in diameter at the point and 2.3 cm. in diameter at the widest portion. This specimen shows some use but is far from being worn smooth. Another fragment which may have been used as a drill (pl. 15, *e*) has a shank about 2.3 cm. long and 1.4 cm. in diameter. It also shows some use. Two other possible drills (pl. 15, *h*, *i*) are chipped on only one face. Both are 2.8 cm. long and 1.4 cm. in greatest diameter. The points are rather blunt.

One very unusual drill-shaped object (pl. 15, *d*) has an overall length of 7.2 cm. Its outstanding features are two pairs of lateral projections, about 2.8 cm. apart. The maximum diameter at the projections is 1.6 cm., although the maximum diameter elsewhere is 0.9 cm. The material is light-brown silicified chalk which does not flake leaving sharp edges. This material is lighter and softer than jasper. In view of some of these properties, the specimen does not seem especially well suited for use as a drill.

Knives.—Of the 21 artifacts from 25HO21 considered to represent knives, only 6 (pl. 17, *a-f*) showed careful workmanship. Two, and possibly the other four which are broken, represent variations of the point type NAb2 (fig. 21). The two nearly complete blades were 4.7 by 2.8 cm. and 4.4 by 2.7 cm. At least two and possibly all four of the broken blades had been larger than the two complete ones. The materials from which these were made were: gray, brown, and red flint or jasper; brown quartzite; and Bad Lands chalcedony. The workmanship on these knives was careful as compared with that on the other knives from the site, but was far from delicate.

The most common type of knife (pl. 17, *g-i*) from the site consisted of a cutting edge chipped on a thin sheet of chalcedony and, in one instance, on a thin sheet of brown jasper. These 10 specimens show little or no chipping except at the cutting edge. The original patinated surfaces were preserved elsewhere.

The other knives show little in common except rough chipping from both surfaces. They seem to be random in shape and seldom show retouching. They are made from flint, jasper, and quartzite.

Sharp flakes and retouched flakes, some as long as 7.5 cm., were apparently used when there was a need for keener cutting edges than are found on the knives. It is frequently difficult to determine whether the chipping on a flake is deliberate or whether it represents use retouching. Usually the retouching on such flakes is from one surface only. Such artifacts grade into side scrapers, and frequently end scrapers show evidence of any suitable edge having been used for cutting. The material again is jasper, flint, chalcedony, and quartzite. Flakes with modified edges are common as compared with other stone artifacts at this site.

Choppers.—The large, crude choppers typical of the Dismal River sites in southern Nebraska are, for the most part, lacking at 25HO21. This could be due to the lack of readily available stone. There are, however, a greater proportion of crude knives at this site than at White Cat Village. It could well be that the knives represent the substitution of smaller but somewhat better-made tools to serve the same purpose as choppers, whatever that might have been.

Only three specimens from 25HO21 are comparable to the large crude choppers mentioned above. The one complete specimen is of brown quartzite and is 7.5 by 5.5 cm. It shows rough chipping, probably by percussion alone, from both surfaces. In size, this specimen is comparable to the smaller specimens from White Cat Village. The two broken specimens from 25HO21 are of green quartzite and show percussion chipping on only one surface. One, in particular, shows much battering of the cutting edge.

The Smithsonian Institution has in its collection from 25HO21 one large crude chopper, in the tradition of those from White Cat Village. This specimen is of greenish quartzite and is 16 cm. long and 6.5 cm. wide. It has a cutting edge chipped along one long side from one surface only.

Scrapers.—Seventy artifacts which could be classified as end scrapers are made from a variety of materials including brown and gray flint, chalcedony, agate, and quartzite. The gray flint seems to be more frequently represented in scrapers than in other types of artifacts. Only one scraper of quartzite and none of Bad Lands chalcedony was found. The end scrapers range in size from about 2.5 to about 6 cm. in length and from about 2 to 3.5 cm. in width of scraping surface. Thickness varies from 0.5 to 1.7 cm.

End scrapers, for the most part, show overall chipping in contrast to the scraping edges chipped on random pieces of stone found so commonly at White Cat Village. Six of the scrapers had small projections or tangs resembling "graver" points (pl. 20, *a-f*). One unusual scraper (pl. 20, *h*) had two concave edges. Both of these edges, along with the scraping edge, seemed to show considerable use. This specimen also had five projections of different sizes which could have been used as "gravers."

A few of the end scrapers had other edges which might also have been used as scrapers or cutting tools. These edges vary from well-chipped scraping edges to mere evidence of use retouching. Only a few of the scrapers showed excessive battering or dulling of the scraping edge.

The eight side scrapers from 25HO21 are less well made than are the end scrapers, and are frequently random pieces of stone which have been beveled on one or more edges from only one face. Less care seems to have been taken in producing an even, uniform edge than in the case of end scrapers, and the scraping edge is frequently thinner on the side scrapers than on the end scrapers. In the artifacts from 25HO21 there is a gradation from a very few well-made side scrapers through crude knives or small choppers on to flakes showing retouching or use-retouched edges. Occasionally there is a combination end and side scraper from this site.

Other chipped-stone artifacts.—One artifact found at 25HO21 appears to be a small "spoke shave." It has a finely chipped concave edge 1.3 cm. across. This could have been used for shaving down arrow shafts or for other similar work. In addition, it has three points which could have been used as gravers.

Three other artifacts (pl. 20, *g-i*) have points but do not seem to represent drills. Two of them have been chipped from only one surface. Since the point appears to have been deliberately formed, these may have been used as gravers. One which is chipped from both surfaces (pl. 20, *g*), however, could represent a poorly shaped point, knife, or drill.

Abraders.—Of the 29 abraders, all broken, found at 25HO21, 23 were of the shaft-polisher type (pl. 24, *a-f*), showing a groove across one face of the stone. The grooves are about 1 cm. in width and vary in depth from 0.1 to 0.5 cm. Only 2 of the 23 had grooves in more than one face. These had one groove in each of two opposite faces.

Six of the abraders had grooves of other widths. One of them had two grooves, 1.0 and 1.5 cm. wide, in one face. These grooves were 0.5 and 0.3 cm. deep respectively. There was also a narrow shallow groove in one end. Four of the abraders had from 1 to 15 narrow, shallow grooves (pl. 24). None was over 0.3 cm. wide and most did not continue across the entire surface. The abraders with the narrow grooves could have been used for such purposes as sharpening awls. One abrader had a shallow groove across one face 1.8 cm. in width. Four were of red Dakota sandstone, the rest were from white to buff Ogalalla (?) sandstone.

Ground stone.—Ten pieces of stone had been ground and pecked and then polished. About as many more may have been polished but are too fragmentary for certain identification. The materials polished are, in order of their frequency: quartz boulders, hard sandstone, and schistlike stone. The specimens large enough to identify appear to have been biscuit-shaped rubbing stones with one or both faces showing use. The faces are either flat or convex. The one complete specimen (pl. 25, *b*) had one flat surface and one unworked surface. Its dimensions are 14 by 8.5 by 2.5 cm.

Two flat pieces of buff sandstone have one face well impregnated with a red substance resembling hematite. One piece of fine-grained hematite shows scraping which, from the direction of the scratches, would appear to have been done with a blade of some kind.

Only two specimens show any sign of battering, as would be expected if they had been used as hammerstones. One of these (pl. 25, *a*) shows use on both ends. This specimen is 9.6 cm. in length and 6.2 cm. in greatest diameter.

WORK IN BONE

Worked bone was abundant and well preserved at 25HO21. Complete and broken artifacts, as well as unfinished artifacts and scraps left from the process of manufacture, were found (table 15).

TABLE 15.—*Bone artifacts from 25HO21*

Artifacts	Number	Artifacts	Number
Scapula digging tools	14	Stemmed projectile point	[1] 1
Shaft wrenches	5	Socketed point	[1] 1
Flesher	1	Scraps from awls, etc	18
Ulna pick	1	Round bead	1
Perforated scapula hoe	1	Awl butts	21
Whistle	1	Splinter awls	11
Eyed needle	1	Flaker	1
Tubular beads	8	Armband	1
Flat awls	7	Rib beamers	4
Triangular awls	18	Spatulas	3

[1] Possibly another.

Worked scapulae.—Fourteen pieces of bison scapulae appear to be portions of digging tools (pl. 36, *a*, *c*). All these lacked the articular end, and several show that the articular end has been cut and then broken off. The scapula spine had been removed from all, and in each case the cutting edge is well polished. Some have a beveled cutting edge, but there is no consistency with regard to which way the edge is beveled, and it is not possible to determine whether the bevel was intentional or a result of use. There is no obvious indication that these tools were hafted.

The only scapula artifact retaining the articulation is shown in plate 34, *c*. Both the costal and dorsal margins of the glenoid cavity have been partially cut away and polished. A hole about 18 by 20 cm. has been drilled through the scapula about 11 cm. from the articulation. The spine has been removed. Unfortunately, little but the neck of the scapula remains, the rest having been broken off. Since none of the digging tools described above retain the articulation, it seems unlikely that this specimen is a portion of such a tool. It more probably represents a hoe or adz type of tool. The cutting away of portions of the glenoid margin has produced a groove perpendicular to the flat portion of the scapula. It seems likely that this was done to facilitate the hafting of the tool, since a handle could be laid in this groove and bound to the scapula by means of thongs passed through the hole and tied to the handle on either side of the scapula. If green thongs were used, the handle would be very securely fastened when the thongs dried.

Fleshers.—The one bone flesher found (pl. 34, *a*) was not toothed and was not found articulated. It was made from a bison metatarsus by cutting or breaking it at an angle. The break was then partially smoothed and a cutting edge sharpened.

Shaft wrenches.—The four shaft wrenches found (pl. 30, *e*) were made from ribs. None of these were complete but were broken at the hole. The drilled holes were about a centimeter in diameter and either worn smooth or polished. The hole in one of the specimens appears to have been either drilled at an angle of about 45° or to have been very much elongated on one side. The hole in another went straight through. Another bone fragment has a hole about 0.6 cm. in diameter drilled through it. The specimen resembles a portion of a shaft wrench except for the smallness of the hole.

Whistles.—One bone artifact found at 25HO21 was probably a bird-bone whistle (pl. 32, *j*). The outside diameters of the bone are 1.1 and 1.5 cm. It has one hole, about 0.6 cm. in diameter, drilled into but not through the bone about 2 cm. from one end. There is no hole for the next 3 cm. but from there on, the side in which the holes would probably be, if there had been more, is broken away. The length of the portion remaining is 12 cm. but this does not represent the entire length of the specimen, since it is broken. There is a V incised in the end of the specimen near the hole. The sides of the V are 0.6 cm. long and the apex is at, and just cuts through, the end of the whistle.

Bone projectile points.—The two bone projectile points found at the site are of different types. The stemmed point (pl. 30, *b*) is rectangular in cross section with the sides slightly convex. The stem is round in cross section. The point appears to have been made from a section of long bone, since just a little of the cancellous inner portion of the bone is found on one side. The surfaces show fine diagonal scratches which appear to have resulted from shaping with sandstone abraders. The body of this point is 7.3 cm. long, 1.2 cm. wide, and 0.7 cm. thick at the largest portion. The stem is 2.2 cm. long and the diameter at the thickest portion varies from 0.6 to 0.7 cm.

The other bone projectile point found (pl. 30, *a*) is ellipsoidal in cross section and socketed to receive the shaft. The specimen is 7.8 cm. long and the diameter varies from 1.0 to 1.4 cm. at the thickest portion. The socket, which tapers, is 1.6 cm. deep, about 0.6 cm. in greatest diameter. Three V-shaped notches have been cut about 0.7 cm. deep into the socket. Thus the exact base of the specimen is represented by three points, nearly equally spaced. The point shows scratches around it as if it had been shaped by being rotated on a piece of sandstone. Another conical piece of bone or antler about the same length and a little larger at greatest diameter may represent another similar projectile point, but its preservation is too poor for it to be positively identified as such.

Another artifact from the Humphrey Site may have also been a bone projectile point (pl. 30, *c*). In most respects, the specimen resembles the awls with a triangular cross section. It has, however, had a round stem worked on the butt end. The specimen is 11.6 cm. long and 1.3 cm. in greatest diameter. In cross section it is shaped like an isosceles triangle, with the two equal sides the longest. The stem (which is nearly round in cross section, about 2 cm. long, and tapering) shows considerable polish, but the point shows little. One side of the specimen shows the cancellous portion of the bone, which suggests that it was made from the edge of a rib. The artifact shows sufficient symmetry to have been intended for a projectile point.

Beads.—Tubular beads were the most common type found at 25HO21 (pl. 32, *a-g*, *i*). The workmanship on these varied greatly, the crudest being nothing more than sections cut from suitable bones, with little or no polishing of even the cut ends. The bead showing the most work (pl. 32, *f*) was slightly barrel shaped and the bone from which it was made had been greatly thinned and highly polished. This bead was 2.0 cm. long and varied in diameter from 1.0 to 1.2 cm. The thickness of the bone was nowhere over 0.2 cm. and in most places it was thinner at the ends, the bead was thinned to a sharp edge. The other tubular bone beads varied from 2 to 5 cm. in length and from 0.4 to 0.8 cm. in diameter. A few scratches were found on the beads but nothing resembling a design was present.

Another bead from the site (pl. 32, *h*) is unusual. It is oval in shape, 0.9 cm. by 0.7 cm., and is 0.3 cm. thick but deeply concave on one side and convex on the other. The concavity equals the thickness of the bead. A round hole through the bead is centrally located and is about 0.2 cm. in diameter. The entire bead is smooth and shows a high polish, even on the concave surface and in the hole. The material is very fine grained and white and has been identified as probably tooth. The workmanship is extremely good.

Awls.—Bone awls were common at 25HO21 and three types were represented. The most common type is triangular to nearly round in cross section (pl. 27, *a-c*), and, for the most part, these appear to have been cut from the edge of ribs. The cancellous inner portion of the bone is visible on one side of the awl. These awls are pointed at one end and usually rounded at the other. Occasionally the points are dull and some examples are rather abruptly pointed.

The second type of awl is represented by pointed flat sections of split bones (pl. 28, *d-f*). These are usually sharply pointed, but show very little work except on the point. The shape and size vary, but they are several times as broad as they are thick. One side is cancellous in nature and seldom indicates any attempt at smoothing.

The third type of awl found at this site consists of random bone slivers which have been pointed at one end (pl. 28, *a-c*). The rough edges above the points may or may not be smoothed. Frequently the points of these awls are very sharp.

A series of specimens closely resembling the awls triangular in cross section were found (pl. 27, *d-f*). However, none of these possessed points. One end was worked smooth, usually rounded, and the other end was roughly broken. If it were not for the fact that many more of these specimens resembling awl butts were found than broken points of awls, it might be assumed that they were broken awls. Only 2 of the 21 specimens showed smoothing of the broken end. The name "punches" has been suggested for these specimens, but this does not seem appropriate since there is no evidence of battering on the end of the tool and the specimens are polished or at least smoothed everywhere but on the broken end.

Scraps and blanks.—The worked bone from the site included many items which appear to have been scraps left from the manufacture of awls. Two pieces (pl. 29, *e*) appear to be blanks for triangular awls. Both of these are the edge sections of split ribs which have been somewhat smoothed along the split edge and on one end. Such long sections were probably cut into proper lengths by scraping the bone thin at one point and then breaking it. Several specimens show the end left by such a cutting method (pl. 29, *b*, *d*). The rough end which was tapered from the thinning was then smoothed into the point (or butt) of the awl.

Several small portions are rectangular in cross section and appear to be scraps remaining from the manufacture of bone projectile points (pl. 29, *a*, *c*).

The Smithsonian Institution has in its collection from 25HO21 a section of bison scapula left from the manufacture of some bone implement, possibly a projectile point. The end from which the implement was severed has sufficient size to have furnished material for a projectile point of the rectangular cross-section type. At this end the bone, exclusive of the cancellous portion, is 1.1 cm. thick and has been worked down to about 1.5 cm. in width. Since no other bone artifact was found which appeared to have been made from this section of a scapula, and since the square projectile point found is so completely worked as to have eradicated any evidence of its source, it is possible that this specimen may represent the scrap remaining after the removal of the section from which a point was made.

Eyed needles (?).—A well-made bone artifact, resembling a curved needle (pl. 33, *a*), was 10.4 cm. long, 0.5 cm. wide, and 0.2 cm. thick. One end is broken, but the other end had a neatly drilled hole about 0.2 cm. in diameter, the edge of which is 0.2 cm. from the end of the artifact. The specimen has been well shaped and smoothed but shows little polish. Kidder (1932, p. 239, fig. 200, *i*) illustrates a very similar artifact except that it does not necessarily appear to be curved. The caption refers to it as "Fragment of bone head-band?" The curvature of the 25HO21 artifact is too great for it to have served such a purpose. The chord joining the two ends of this artifact is 8 cm. long. The distance from the midpoint of the chord to the artifact is 2.7 cm. There is no evidence of the specimen's having been used as a needle since there is no evidence of polish through use or of polish in the eye. In addition, there is no taper to the specimen.

A much shorter specimen may represent another similar artifact (pl. 33, *b*). It is 4.4 cm. long, 0.6 cm. wide, and 0.3 cm. thick. The specimen shows much less curvature than does any portion of the longer specimen. On the inside is a groove about 0.1 cm. from the end and less than 0.1 cm. wide. The groove is found only on this one side. The end nearest the groove is squared off and somewhat smoothed. The preservation of the bone is not too good, so it is difficult to determine whether or not the other end has been smoothed.

The Smithsonian Institution has in its collection from this site still another fragment of a similar artifact. This specimen is 6.1 cm. long, 0.8 cm. wide, and 0.3 cm. thick. A hole a little over 0.2 cm. in diameter is drilled through the specimen 0.7 cm. from one end. The other end is broken. The specimen shows slight curvature and is well finished, with square corners throughout.

Armband (?).—A perforated bone artifact in the Historical Society collection from 25HO21 (pl. 33, *c*) may represent a head or armband. Only one corner of this specimen remains. The specimen varies in thickness from 0.2 to 0.3 cm. and is 12 cm. long and 4.1 cm. wide. The hole, which is very near the corner, is 0.3 cm. in diameter and nearly round. The curvature is considerably less than that of the needlelike artifact. The chord distance between the two ends is 10.8 cm. The midpoint of the chord is 2.0 cm. from the artifact. The preservation of this artifact is not good so it is difficult to determine the degree of polish which it may have had. The grain of the bone appears to run lengthwise of the artifact. Four scraps of bone appear to have been worked in a similar manner. These pieces, which are much better preserved than the armband, appear to have been left from the manufacture of other artifacts. All of them appear to have been thinned by scraping on both the inside and outside of the bone. Cutting was done by sawing or cutting nearly through the bone and then breaking. The thinning appears to have been followed by flattening the bone and eventually forming the bone by curving it in the direction opposite to that in which the bone was originally curved. The four fragments appear to have been cut off at different stages of manufacture.

Bone spatulas (?).—Three other flat, thinned pieces of bone were found (pl. 31, *a*, *b*). Two of these are spatula shaped with one rounded end. The smaller one, which shows the least thinning, is well impregnated with what appears to be red hematite. The other rounded spatula is thinned to almost a sharp edge which shows considerable polish. The third artifact in this group has a blunt point which shows shaping, smoothing, and some polish. Except for the point, which shows the definite work, the artifact is only superficially smoothed.

Worked rib sections.—Four rib sections from this site have been cut or broken and the ends polished (pl. 31, *c*, *d*). Only one has both ends present. It has a large sliver broken or cut out of the side. These specimens all show considerable use of one or both of the thin edges of the rib. In one specimen, the edge has been worn into the cancellous portion of the bone. All the specimens appear to represent relatively straight sections of ribs, probably bison. These could possibly be considered "beaming" tools.

Ulna pick (?).—One bison ulna shows considerable battering on the pointed end (pl. 34, *d*). The battering has apparently resulted from use, although not necessarily from use as a pick.

Flaker (?).—A piece of antler tine (pl. 30, *d*) 8.5 cm. long was found at the site. The large end has been partly cut and then broken off. The specimen shows some indication of having been smoothed by scraping, and has been polished, probably by use. The tip has been broken off, perhaps by use of the specimen as a flaking tool for working flint, etc. This use, however, cannot be verified.

One piece of split long bone (pl. 34, *a*) has a working edge much like that on a flesher. The bone fragment shows little work except for the cutting edge, 3.8 cm. long, which is beveled toward what was the inside of the bone and shows considerable polish from use. The entire artifact is 16.5 cm. long. It was probably used as either a digging tool or a skinning tool.

Faunal remains.—The unworked bone from the Humphrey Site was identified by Theodore White, paleontologist with the Smithsonian Institution. The animals which he found represented are listed in table 16.

TABLE 16.—*Faunal remains from 25HO21*

Turtle (enys?)
Deer
Antelope
Bird
Dog
Terrapin
Badger
Elk
Beaver
Frog
Mink?
Jackrabbit
Rabbit
Snapping turtle
Skunk
Eagle (?)
Bison

TRADE MATERIAL

One small fragment of iron was found associated with the cultural material at 25HO21. The specimen was too small and rusted to be further identified.

VEGETAL REMAINS

Three grains of charred corn were recovered from the occupation level at 25HO21. The occurrence of corn along with scapula digging tools strongly suggests that agriculture was practiced here. The use of wild plant food was attested by the presence of cherry pits at the site. The abundant charcoal from the site has not yet been analyzed to determine species of wood represented, nor have the possibilities of securing dendrochronological dates for the site been assessed.

SUMMARY AND CONCLUSIONS

A considerable amount of information was obtained from site 25HO21 considering the relatively small amount of testing done. The artifact inventory was surprisingly varied. Although neither house patterns nor bell-shaped roasting pits were found, the evidence obtained indicates that this site belongs to the Stinking Water Focus of the Dismal River Aspect. To be sure, there were minor differences in relative abundance of various artifacts. The differences in stone work such as an apparent substitution of smaller and better-made tools for larger, cruder tools could easily reflect differences in the amount of raw material available. The greater relative abundance of bone artifacts at 25HO21 could be due in part to better conditions for the preservation of bone.

Subsistence apparently was based primarily on hunting, small animals having been utilized along with the larger ones. The presence of charred corn and scapula digging tools would indicate the practice of agriculture and provides the first good evidence of aboriginal agriculture in the Sandhills area. Wild plant foods were utilized, as evidenced by cherry pits. The relative abundance of skin-dressing tools and awls suggests extensive use of skins, which would be expected in a subsistence economy centered on hunting. The absence of both fish and horse bones from this site is of interest, since such bones are lacking at other Dismal River sites and in view of the suggested ethnohistoric identification of the Aspect with Athabascans, who traditionally used no fish and were late in obtaining horses.

Dating for this site is only speculative, but it was probably occupied about 1700. This date is suggested because of the presence of metal and because of the great similarity between the material from this site and that from sites dated by dendrochronology. There is charred wood from the site which might furnish dates if a tree-ring series is ever established for that area.

This site seems more worthy of further excavation than any of the other Dismal River sites in the area because it has not been damaged by blowouts and because it apparently is very prolific. The occurrence of postholes and fireplaces would suggest that further work might lead to the discovery of house patterns.

SITE 25HO24

INTRODUCTION

Site 25HO24 is located about 2 miles east of Mullen, in Hooker County, Nebr. The site, which is now slightly grassed over, has been badly scarred by blowouts in the past. It is located on the second terrace on the south bank of the Middle Loup River. Marvin F. Kivett, with a party from the Nebraska State Historical Society, tested the site in the summer of 1949. Previously, the site was known to local people, who had done a little digging. It is Kivett's opinion that most of the village level has been blown away.

Excavation at the site was confined primarily to the clearing of a badly burned, trash-filled pit. The pit contained charred wood and other material, burned bone, both worked and unworked, burned clay, burned stone, both worked and unworked, and pottery sherds. Much of the bone and stone was so damaged by the burning that it was not recoverable. An especially interesting feature of the pit was the many bone beads found in it. A few scattered postholes were found at the site but these failed to form pattern.

POTTERY

The pottery from site 25HO24 is highly comparable to that from site 25HO21. It appears to be about equally divided between simple stamped and smooth. The thickness varies from 1.3 to 1.1 cm. and the color ranges from buff to gray and black. Tempering varies from none to moderate amounts of fine to medium-large sand. The paste is gritty, moderately compact, and fine textured. The sherds generally break squarely and seldom split.

The lips of the rim sherds from 25HO24 showed a few decorative techniques not found thus far at other Dismal River sites (fig. 22). One of these consisted of incised zigzag decoration in a thickened, flattened lip. Another sherd had broad punctates in the lip, apparently made with fingertip because the impression of the fingernail is evident. Another sherd had large diagonally impressed lines almost across the lip. The impressions are 0.3 cm. wide and lack about 0.2 cm. of extending across the outer margin of the sherd. These could have been intended as elongated punctates which did not extend across the lip. Two other sherds showed irregular roughening of somewhat thickened, flattened lips. One rim sherd had diagonally incised lines across the lip. Nine sherds had smooth lips varying from rounded to somewhat flattened and thickened.

One small fragment of a clay pipe was recovered from 25HO24.

WORK IN STONE

Much of the stone from 25HO24 came from a pit which had been heavily fired, resulting in the destruction of many artifacts. However, two fragments of projectile points were found at another part of the site. One of these, type NBb, was made of obsidian. The other was of chalcedony and was represented by the point only. Four end scrapers and a fragment of a side scraper were also found. Three specimens, two of which were badly fire spalled, appeared to be large, crude choppers. The largest of these was 16 by 9 cm. One arrowshaft polisher and another piece of fine sandstone with many fine grooves were found also. A few chipped pieces of stone showed worked edges but no particular shape.

WORK IN BONE

Much of the bone from 25HO24 came from the heavily burned pit and was consequently badly damaged. Thirty-nine bone beads or sections of bone beads plus several smaller fragments were found in this pit. A few of these may represent sections of the same bead. In general, the beads show little work except for the cutting off at both ends. There is little difference in diameter in a single bead. Although it is not always possible to determine whether a bead is complete or broken, nine beads appearing complete varied from 4.3

cm. to 5.8 cm. in length. The largest diameter is 0.9 cm. None of the beads showed any decoration. The same burned pit yielded sections of what appeared to have been two flat bone needles (?) or headbands (?) such as were found at 25HO21. None of the fragments showed any indication of eyes. Three fragments were rectangular in cross section, 0.6 cm. wide and 0.4 cm. thick. The other 11 fragments were also rectangular in cross section and were about 0.9 cm. wide and 0.4 cm. thick.

A flat splinter bone awl was excavated from the site. This specimen is 7.2 cm. long and 1.5 cm. wide at maximum width.

A large amount of rotten wood was found at the site, especially in postholes.

Several pieces of black, porous, charred or coked material found in the burned pit closely resemble some of the material found in the fireplace of House VI at the White Cat Village although the material from 25HO24 may be more porous.

SITE 25HO30

The Nebraska State Historical Society has a surface collection from site 25HO30, which is located 8 miles southwest of Mullen, in Hooker County, Nebr. Most of the pottery from the site is Dismal River but some is similar to the pottery found at Glen Elder, Kans.

SITE 25HO31

Site 25HO31 is located about 13 miles southeast of Mullen, in Hooker County, Nebr. The Historical Society's collection from the site contains what appears to be Dismal River pottery but with coarser sand tempering than is usually found. A little pottery from the site appears to be Glen Elder.

SITE 25HO32

Site 25HO32 is located 15 miles southwest of Mullen, Nebr. The Historical Society's collection from this site contains coarsely tempered pottery similar to that found at 25HO31. This probably represents a variation of Dismal River pottery.

SITE 25HY4

The Nebraska State Historical Society has Dismal River pottery from one site in Hayes County, Nebr. This, the Horn Site, 25HY4, is located about 3 miles northwest of Palisade, Nebr. One rim sherd has a smooth, rounded lip. Some of the sherds show a little mica. Two chips of obsidian were also found.

SITE 25C25

Site 25C25 is a blowout about 30 miles north and west of Mullen, Nebr. The Nebraska State Historical Society has a small collection from this site. The pottery resembles, for the most part, material found at various sites in Nebraska and Kansas which has been designated as "Glen Elder" after a site in Kansas. There are a few sherds, however, which look very much like Dismal River and which, because of their paste, do not fit into the other series.

SITE 25C27

The Nebraska State Historical Society has a large amount of pottery from site 25C27, all of which appears to be Dismal River, although some of it is sand blasted, making identification difficult. The tempering in some of the sherds is a little coarser than is usually found in Dismal River pottery although several sites in the same general area have yielded pottery similarly tempered. A few of the sherds (pl. 9, *b*) have a surface treatment or decoration not yet reported from other Dismal River sites. These sherds have what appears to be rows of square to rhomboid punctates covering the entire sherd. The punctates are not especially distinct or regularly spaced and some sherds appear to have received some smoothing after the decoration was applied. The treatment somewhat resembles a form of check stamping but the surfaces are so eroded from sand blasting that a precise description is impossible.

The stone in the collection from this site is not especially distinctive although a few pieces of obsidian are present.

SITE 25C28

The Nebraska State Historical Society's collection from site 25C28 contains very little material, but the pottery appears to be a mixture of Dismal River sherds and Glen Elder sherds. This site is near the North Loup River, about 12 miles northwest of Brownlee.

SITE 25C29

Site 25C29 is located near the North Loup River, 9 miles northwest of Brownlee, in Cherry County, Nebr. The Historical Society has in its collection from this site small sand-blasted sherds which look very much like Dismal River. Some of the sherds appear to have been refired.

SITE 25TM1

Site 25TM1 is located about 5 miles west of Thedford, in Thomas County, Nebr. It consists of an extensive blowout at the north edge of the high table along the south side of the Middle Loup River.

The Nebraska State Historical Society has a small surface collection from site 25TM1. The pottery is primarily Upper Republican with a few small Dismal River sherds. The collection also includes an expanded base drill, a point of type NBb1, two fragments of points of type NBb, the point of another, and numerous stone chips.

SITES IN LINCOLN COUNTY, NEBRASKA

Harry E. Weakly supplied the Laboratory of Anthropology of the University of Nebraska with small surface collections from, and the legal descriptions of, sites in Lincoln County, Nebr. Eight of these sites had yielded Dismal River pottery. In the summer of 1949 a survey party from the Laboratory of Anthropology attempted to relocate these sites. Unfortunately several of the sites had been destroyed by construction work or had grassed over since the drought years when the sites were first reported.

SITE 25LN2

Site 25LN2 is located about 8 miles south and west of North Platte, Nebr. The collection sent in by Weakly contained an abundance of Dismal River pottery. It ranged in thickness from 0.2 to 0.8 cm. The paste was compact and gritty, containing little or no sand tempering. The sherds are both simple stamped and smooth, some with a suggestion of polish.

The most interesting feature of the sherds from this site is the use of finely incised line decoration. Three rim sherds, all from the same vessel, were unusual for Dismal River. The rim (pl. 10, *f*) was definitely recurved and met the shoulder area of the vessel at a nearly right angle. The rim area, which was about 4 cm. high, was decorated with areas of opposed diagonal lines. The lines were spaced about 0.2 cm. apart. The shoulder area was similarly decorated but the lines were slightly farther apart. The lip was decorated with diagonal, elongated punctates. The paste of these sherds had all the characteristics of Dismal River pottery. It was black, compact, gritty, and contained a little very fine sand. In addition, none of the pottery from the site could be identified as anything except Dismal River. The other rims from the site were smooth and either flattened or rounded. A few sherds, either body sherds or rim sherds from which the lip had been broken, showed fine parallel trailed lines.

Three projectile points from the site were included in the collection. Two points of types NBa and NBa1 were made from quartzite. The third, type NBb1, was made of brown jasper.

The site has been destroyed by the construction of a canal.

SITE 25LN3

Site 25LN3 is located about a mile northwest of Somerset, Nebr., on a ridge about 30 feet high rising out of a pleasant valley about 2 miles above the headwaters of Medicine Creek. The rich little valley, only a mile or so wide at this point, offers a pleasing contrast to the rolling, sandy area surrounding it. Just to the southeast of the site is a lagoon which still holds water for part of the year.

Weakly's collection from the site contained 31 Dismal River sherds plus many very tiny sherds too small to catalog separately. One sherd was of special interest (pl. 9, *c*). It was decorated with an area of elongated punctates or tool marks. These were about 0.5 cm. long and 0.3 cm. wide, and were closely spaced in rows. They were so arranged that a punctate was opposite a space in the next row giving the impression of rows and diagonal check rows. The punctates were not evident from the inside. The paste of the sherd was dark brown and well within the range of Dismal River pottery.

The Laboratory of Anthropology survey party relocated the site and found worked and unworked stone and a few bone fragments but no pottery. Robert R. Halsey, nephew of Douglas McDermot who farms and owns the site, has a collection of material from the site including Dismal River and Upper Republican pottery, worked stone, and a clay trade pipe, as well as two extra stems from such a pipe.

SITE 25LN4

Site 25LN4 is located about 6 miles south of North Platte, Nebr. The collection sent in by Weakly from this site contains both Dismal River pottery and cord-roughened pottery, probably Upper Republican. Both types are well represented. The site is on an erosion remnant almost completely cut off by deep gullies from the main portion of a high, level tableland. It is easily accessible only by means of one rather narrow neck of land, and commands an excellent view of the valley. There is, however, no apparent source of water in the vicinity unless there has been a spring nearby. The Laboratory of Anthropology 1949 survey found some worked stone but no pottery at this site.

SITE 25LN5

Site 25LN5 is located north of North Platte, Nebr., about one-half mile north of the North Platte River. The area slopes quite gently up from the river and is on a low terrace but well within the river valley. The site has been destroyed by the building of a large highway and the development of a suburban district. Three types of pottery are included in the collection sent to the Laboratory of Anthropology by Weakly. Heavy cord-roughened sherds comprised the bulk of the pottery, but the collection included a number of sherds resembling Glen Elder pottery. A few sherds which were definitely out of the range of this pottery are identifiable as Dismal River.

SITE 25LN6

Site 25LN6 is located just south of the South Platte River, opposite North Platte, Nebr. The legal description would place the site on a very low terrace, not much above flood level. Weakly sent four Dismal River sherds, two of which fit, to the Laboratory of Anthropology from this site. The sherds are dark gray, about 0.5 cm. thick, and appear to have a very hard, compact, fine-textured paste. The outer surfaces are smooth but slightly irregular. One lip is rounded in one place and is slightly flattened and thickened at another. The sherds are within the range of Dismal River pottery and closely resemble some of the pottery examined from sites in Colorado. It seems likely that the sherds are from a single vessel.

SITE 25LN7

Site 25LN7, or the Kelso Site, is located on Birdwood Creek, about 16 miles north and west of Hershey, Nebr. Weakly gave the Laboratory four sherds from this site. Two of these appear to be Dismal River and two appear to be Upper Republican. In addition, the 1949 survey party found more Dismal River sherds at the site. The landowner, Mr. Kelso, gave the party another sherd from the site which contained enough mica to give the surface a spangled appearance. He also gave them a large white porcelain (?) bead, one of several which he had found on the site. The survey party found several pieces of worked and unworked stone, including a chip of obsidian; also a small blue glass trade bead. Both Mr. Weakly and Mr. Kelso reported boulder-lined fireplaces at the site. The survey party did not find the fireplaces, but they did find burned rocks and fragments which appeared to be from such fireplaces. Several depressions which Kelso thought might represent houses were tested but with negative results.

SITE 25LN9

Site 25LN9 is located about 2 miles north of Dickens, Nebr. The site as reported by Weakly was located in a blown-out field, but the 1949 survey party from the Laboratory of Anthropology could not relocate the site. One sherd from the site is badly sand blasted and partly refired but is still within the range of Dismal River pottery. The other seven sherds from the site appear to have been painted and are probably of southwestern origin. The paint appears to have been red and black on sherds with orange-buff surfaces and a gray core. The sherds are small and sandblasted. The painted areas appear to have withstood the sand blasting better than the unpainted areas.

SITE 25LN10

Site 25LN10 is located about 3 miles south from North Platte, Nebr., on a high point commanding a view of much of the Platte Valley and is known locally as Lookout Point. The collection from the site contains a predominance of Upper Republican pottery with a few pieces of Dismal River. The Dismal River pottery is both simple stamped and smooth to almost polished. The sherds are generally dark on the inside and buff on the outside. One fragment of what appears to be a pottery pipe was also found. The site has been partially destroyed by construction work.

SITES IN SOUTHWESTERN NEBRASKA

SITE 25CH1

INTRODUCTION

The first Dismal River village site to be extensively excavated was the Lovitt Site, 25CH1, which is located 12 miles north of Wauneta, Nebr., in Chase County. This site was partially excavated in 1939 by the Nebraska State Historical Society with W. P. A. labor. The report of this excavation along with a summary of the Dismal River Aspect, as it was known at that time, has been the principal source of published information concerning the Dismal River Aspect (Hill and Metcalf, 1942). In the course of excavation about 3,000 square yards of the area were uncovered. The site was excavated in 10-foot squares, for the most part.

The village, which covers about 75 acres of low terrace along the east side of Stinking Water Creek, is nearly surrounded by the walls of the valley, which would protect it to a considerable degree both from observation and the full effects of the wind.

STRUCTURES

Only two house structures were found at the Lovitt Site. House I had 32 postholes forming portions of three circles around the fireplace (Hill and Metcalf, 1942, pl. X, 1; pp. 169–170). All these poles were located within a circle about 20 feet in diameter. None of these posts appeared to have been over 5 inches in diameter. Dismal River pottery, stone and bone artifacts, and a few pieces of metal were found on the floor of House I which was about 10 inches below the surface.

House II was represented by five postholes arranged in a circle about 11 feet in diameter around a fireplace (Hill and Metcalf, 1942, pl. IV, 1; pl. X, 2; pp. 170–171). The postholes averaged 3½ inches in diameter and varied from 17 to 28 inches in depth. The house was in a portion of the site which had been badly eroded, and the fireplace was only 3 inches below the surface. A few scattered post molds were found in the immediate area, but they did not show any direct connection with the structure.

A third possible structure was represented by three parallel rows of post molds (Hill and Metcalf, 1942, pl. IV, 2; pl. X, 3; pp. 171–172). Two of the rows consisted of three post molds and the third of two. However, a disturbed area could have eliminated a ninth post mold which would have completed an approximate square. This pattern was interpreted as possibly representing a sunshade or summer shelter.

The most common structural features at the site were irregularly shaped shallow pits. Frequently the pits consisted of several smaller connected pits. The pits varied from 12 to 51 inches in depth and from 1 to 15 feet in diameter. In general the fill in the pits was darker than the surrounding area and contained ash, charcoal, bone, artifacts, and general camp detritus. None of these pits showed evidence of intensive firing although a few had lenses of charred plant material which appeared to have been burned in the pits. The use of the pits is problematical. They appeared to be entirely unsuited for storage or cache pits. They may have been borrow pits from which dirt had been removed for some structural purpose, or they may have been dug strictly for the disposal of refuse. Midden areas, as they are commonly thought of, were not found at the Lovitt Site, nor were heavily burned roasting pits, such as occur at some other Dismal River sites.

POTTERY

The Nebraska State Historical Society has in its collection four restored vessels from 25CH1, and the Laboratory of Anthropology has one restored vessel (pl. 8). The vessels are globular to somewhat elongated, with slightly pointed bases. The necks are somewhat constricted, and the straight or slightly curved rims are either vertical or slightly flaring. The vessels are small to medium in size, ranging from about 10 to 23 cm. high and from about 12 to 23 cm. in greatest diameter.

A detailed description of the pottery from 25CH1, the Lovitt Site, is available (Hill and Metcalf, 1942, pp. 179–185), so will be summarized only briefly. A reexamination of the pottery from this site yielded very little additional information.

The pottery varies in color from buff to gray and black. Fractures are usually in straight lines and are clean. Tempering material, when it occurs, is sand or occasionally mica. About 70 percent of the sherds have a smooth surface, and the others have a simple stamped surface. Most of the sherds are harder than 3 but softer than 4.

Decoration is usually confined to the lip of the vessel and occurs on 62 of the 425 rim sherds. Lip decoration consists of incised, impressed, or punched designs (fig. 23). A few sherds had incised decoration such as horizontal parallel lines, areas of horizontal lines alternating with areas of diagonal lines, or incised triangles. One mica-tempered sherd has a row of three nodes about 0.8 cm. in diameter and 1.4 to 1.8 cm. apart appliqued on the surface.

Rim forms found at the Lovitt Site are flared, vertical, reverse curved, and bowls (fig. 24). No handles or lugs were found, but one rim sherd has a vertically placed ear.

Fragments of two miniature vessels are included in the material from the site.

One variant pottery type from 25CH1 not previously reported appears to have been coiled (pl. 9, *a*). Two sections, probably from the same vessel, have horizontal rounded ridges or corrugations spaced about 1 cm. apart. The ridges show a little polish but the grooves are rough. The vessel appears to have been globular with a somewhat constricted neck. No rim sections are present, but the neck has been smoothed and joins the body in a smooth curve. The sherds show a definite tendency to break along the grooves. The paste is comparable to that of other pottery from the site. It is gritty and compact and contains a moderate amount of fine sand tempering. The hardness is between 5 and 6.

A few sherds of Woodland pottery were also found at the site.

Pottery pipes are reported from the site. These are mostly tubular in shape, although part of at least one elbow pipe was found. They are made of the same paste as the vessels, but are much more frequently decorated. Decoration usually consists of incised lines, although punctates are also used (Hill and Metcalf, 1942, pp. 179–185; pl. VII, 1).

WORK IN STONE

Roughly chipped tools are typical of the worked stone at 25CH1, but some of the artifacts showed fine chipping. End scrapers were most common among the stone artifacts, but side scrapers were also numerous. The projectile points from the site are predominantly of types NBa, NBa1, NBb, NBb1, but a few other types were found.

Objects classed as knives varied from retouched flakes to well-made diamond-shaped knives with the four edges alternately beveled. Several artifacts classified as celts are apparently comparable to some of the objects classified as choppers from White Cat Village.

The drills from 25CH1 were predominantly of two types; the expanded-base type and the straight or cigar-shaped drills. In addition, a few specimens from the site are like the latter except for one, two, or three projections near the center of the specimen.

Arrow-shaft polishers and other sandstone abraders were the most common artifacts of ground stone found at the site. Metates of compact sandstone, pecking stones, and one broken grooved maul also were found. Two types of stone pipes are reported: an elbow-shaped pipe of limestone, and tubular or "cloudblower" pipes of steatite. One fragment of catlinite (?), presumably from a pipe, was found. A turquoise bead and another ground-stone object classified as a pendant were also found. Pieces of hematite, yellow ocher, and mica also occurred at the site, but none of these had been fashioned into any particular form. The mica was presumably used as the source of tempering in some of the pottery and the other two minerals are considered sources of pigment (Hill and Metcalf, 1942, pp. 188–195; pl. VII, 2; pl. VIII).

WORK IN BONE AND ANTLER

Worked bone was common at 25CH1. The most common bone artifacts were scapula hoes or spades, either with or without the articular surface. Knives were also found which were made from sections of scapulae. Three types of awls were found: flat awls, splinter awls, and awls round to triangular in cross section. Some specimens called punches were very much like the latter type except that the point was very blunt. These could have been used for flakers.

Tubular bone beads, one with finely incised straight-line decorations, were found at the site.

Fleshers made from the metapodials of elk or buffalo were also found. The cutting edges were both smooth and toothed. Several hemispherical sections of bone with cancellous portions exposed were interpreted as hide tanners. A small cancellous section of bone well impregnated with red pigment was thought to be a "paint brush."

Several stemmed bone and antler projectile points were found. A portion of a broken bone shaft wrench was also recovered.

Two pieces of antler tines were found which had a notch cut out near the point. These are thought to represent hafts for end scrapers. Several bison or elk ulnae were found which had apparently been used as picks. Other pieces of bone had apparently been worked, and some pieces of worked shell, probably ornaments, were found (Hill and Metcalf, 1942, pp. 195-202; pl. IX).

TRADE MATERIAL

Several pieces of metal were found at the site. These included iron and copper jingles, a tubular rolled copper bead, a brass object which may have been a projectile point, four iron awls, and several amorphous metal pieces (Hill and Metcalf, 1942, pp. 202–203; pl. VI, A, C, D, E, F, G).

FAUNAL REMAINS

The bones recovered from the site were predominantly bison, but elk, deer, and antelope bones were numerous. Other remains included beaver, turtle, and canis. Skulls and foot bones of the latter were not uncommon in pits. It is interesting to note that fish and horse bones were not identified from the site (Hill and Metcalf, 1942, p. 204).

VEGETAL REMAINS

Charred corn, corncobs, and cornhusks were found in several pits. Pits of wild plums, hackberries, and perhaps chokecherries were also found (Hill and Metcalf, 1942, pp. 204–205).

DENDROCHRONOLOGY

A dendrochronological study by H. E. Weakly resulted in the establishing of an outside date of 1706 on samples of charcoal from 25CH1 (Hill and Metcalf, 1942, p. 205).

BURIALS

A search was made for burials in the area around 25CH1, but none were found (Hill and Metcalf, 1942, p. 205).

SITE 25CH7

The Nebraska State Historical Society has small collections containing Dismal River pottery from several sites in Chase County, Nebr., other than the Lovitt Site.

Dismal River pottery was found at the McCallum-Hofer Site, 25CH7, about 9 miles north of Wauneta, Nebr. Much of the pottery from this site is buff colored and relatively thick and resembles the Dismal River pottery from Ash Hollow Cave. One rim sherd is thin and has a rounded, diagonally incised lip. There is only one mica-tempered sherd in the collection; the others show little or no tempering. Nearly all the sherds are smooth, only a few being simple stamped. One chip of obsidian was found at the site.

SITE 25CH8

The Skelton Site, 25CH8, yielded Dismal River pottery much like that from the Lovitt Site. Triangular, side-notched points and a chip of obsidian were found at this site. The site is located about 6 miles north of Wauneta, Nebr., near the forks of the Stinking Water Creek.

SITE 25CH14

The Baker Site, 25CH14, yielded both smooth and simple stamped Dismal River pottery. One rim sherd has a thinned lip incised with a fine chevron design. One smooth sherd has what may have been parallel trailed-line decoration. The site is located 6 miles north of Enders, Nebr., on the south bank of the south branch of the Stinking Water Creek.

SITE 25DN1 [7]

INTRODUCTION

The Nichols Site, 25DN1, is located on the north and east side of Muddy Creek, 7½ miles north of Max, in Dundy County, Nebr. This site is on a gently sloping terrace which in places drops abruptly to the creek and in other places is separated from the creek by lower terraces. Immediately surrounding the site, the terrain is very rough.

The site was tested by the Nebraska State Historical Society in the spring of 1939. Their excavations consisted of a north-south trench 150 feet long crossed at the north end by an east-west trench 250 feet long. The trenches were 20 feet wide and were laid out in 10-foot squares.

No houses were found. However, 14 pits were reported. Most of the pits were quite shallow and irregular in shape, varying considerably in size. Most of these pits contained small amounts of camp detritus such as bone fragments, pottery sherds, worked stone and bone, burned vegetal material, and in one case a fragment of rusted iron.

ROASTING PITS

Two of the pits were bell-shaped roasting pits and have been reported previously (Hill and Metcalf, 1942, pp. 177–178).

The bottom of one pit was 57 inches below the surface of the ground. It had a maximum diameter of 62 inches at a point 10 inches above the floor. The diameter of the neck where it could first be determined, about 9 inches below the surface, was 46 inches. The other pit was 36 inches deep, with the greatest diameter of 60 inches at a point 8 inches above the floor. The diameter of the neck where it was first detected was 30 inches.

The bottoms of both pits were covered with a layer of charcoal and ashes several inches thick. On top of this layer was a layer of limestone 8 to 10 inches thick, badly decomposed from heat. On top of the limestone was a thin layer of charred corncobs and cornhusks and in one pit a charred ear of corn in the husk. The fill above this consisted of burned and clean dirt and then trash.

---

[7] Report based primarily on field notes of P. Newell on file at the Nebraska State Historical Society

POTTERY

The pottery from 25DN1 is comparable with, if not identical with, that from 25CH1 and 25HN37. The color was from black to dark gray with an occasional buff sherd. The paste is fine textured, quite compact, and gritty, with from moderate amounts of fine sand tempering to no tempering in addition to the fine grit in the paste. The surface varies from deeply simple stamped to smooth and somewhat burnished in appearance. Frequently the simple stamping appears to have been partially or almost completely smoothed off.

Only three decorated lips are included in the 15 rim sherds from the site. One lip is decorated with diagonally impressed lines, another with elongated punctates placed tangently in the lip, and the third has incised chevrons pointing around the lip. The smooth lips are both rounded and flattened and vary from thinned to considerably thickened. In general, the thickened lips tend to be flattened while the thin lips tend to be rounded. The rims are both smooth and simple stamped.

One fragment of a pottery pipe probably represents a cloudblower type. The pipe was decorated with parallel incised lines from 0.2 cm. to 0.3 cm. apart. The lines appear to have encircled the pipe and are to be seen on the outer surface of the entire fragment which is from 0.3 to 0.6 cm. thick. The hole through the pipe has been at least a centimeter in diameter. The paste is very similar to that found in the pottery from the site.

The Laboratory of Anthropology has in its collection from the surface of the site one sherd which contains a large amount of gold-colored mica in the paste. The outer surface of this sherd is black and deeply simple stamped. The inner surface is smooth and dull orange. The mica is far more noticeable on the inside. The paste of the micaceous sherd appears to be well within the range of that found in the rest of the pottery from the site with the exception of the addition of the mica.

Surface decoration on pottery from the Nichols Site is not common. A few buff to gray sherds have dark areas suggestive of paint. The Nebraska State Historical Society has one sherd with a single narrow trailed line. The Laboratory of Anthropology has one sherd with three parallel, narrow trailed lines (pl. 10, *b*) and another with a single twisted cord-impressed line (pl. 10, *e*) from the surface of the site. Painted sherds, probably of southwestern origin, have been found by a group including the present writer, and are said to have been found on the site by local collectors (Hill and Metcalf, 1942, p. 194).

There are no restored pots from this site. One sherd, however, suggests a somewhat globular-shaped vessel with a flaring rim. The rim is about 2.5 cm. high and the vessel appears to have been about

13 cm. in maximum diameter. The neck shows considerable constriction. The walls of the vessel are about 0.4 cm. thick. The lip is smooth and somewhat rounded. The surface shows horizontal marks but no simple stamping. The marks probably resulted from smoothing the vessel.

WORK IN STONE

Worked stone was relatively common at 25DN1. The greater portion of the chipped stone from the site was yellow to brown jasper with only an occasional piece of gray flint, chalcedony, and quartzite. The majority of the chipped-stone artifacts were scrapers. There are 54 end scrapers in the Nebraska State Historical Society's collection from the site. Many of these show use on other edges as side scrapers or knives.

Side scrapers are fully as common, but it is more difficult to delimit this type of artifact. There is an even gradation starting with crude choppers, chipped from only one surface, through side scrapers, flakes with retouched edges, and flakes with use-retouched edges. Frequently more than one edge shows flaking. The workmanship varies from rather crude percussion chipping with little or no pressure retouching to very fine, well-controlled pressure chipping. There is no consistency in the shape of these artifacts. The edges appear to have been chipped on pieces of stone with almost any shape.

The scrapers, especially the end scrapers, show much less battering or extreme dulling of the scraping edge than did those from White Cat Village.

Only five points were found at 25DN1 by the Nebraska State Historical Society. Four of these were made of brown jasper and one was made of chalcedony. The University of Nebraska, Laboratory of Anthropology, has an additional 15 points from the surface of the site. These points are made from brown to yellow jasper except for three points made from chalcedony, obsidian, and white flint. The projectile-point types found at this site are listed in table 17.

TABLE 17.—*Projectile points found at 25DN1*

Type	Historical Society	University of Nebraska	Total
	Number	*Number*	*Number*
NBa	1	4	5
NBa1	1	2	3
NBb	2	5	7
NBb1	0	1	1
Indeterminable	1	3	4
Total	5	15	20

Five drills were also found at the site by the Nebraska State Historical Society. Three of these were expanded-base drills. The one which was perfect had a point 1.8 cm. long and 0.6 cm. in greatest diameter. A cigar-shaped drill showing much use was also found. The portion remaining is 6.9 cm. long and 1.4 cm. in greatest diameter. Another drill appeared to have been a small cigar-shaped drill 0.9 cm. in greatest diameter, which had had a smaller point chipped in it. The smaller portion was 1.0 cm. long and 0.5 cm. in greatest diameter.

Large, crudely chipped choppers were much less common and were smaller at the Nichols Site than at White Cat Village. However, the specimens found showed chipping from both two surfaces and one surface.

Some of the scrapers had points with convex surfaces that could have been used for gravers. One specimen had a concave notch 0.9 cm. wide chipped from one side as though it had been intended for a "spoke shave." The concave edge was smooth except for one small projection which divided it into two smaller concave edges. The piece had a large convex edge so chipped as to form slightly more than a semicircle, the diameter of which was 1.9 cm. One irregularly shaped piece of jasper had a finely chipped, graver-sharp point.

Only three specimens from the site appear to be portions of well-chipped knives. All these are so fragmentary that their original shape is not determinable.

Seven fragments of sandstone abraders are included in the Historical Society collection from the site. They are made from both white and brown sandstone. At least one had been of the shaft-polisher type. Three other pieces of ground stone came from the site, but all are too fragmentary to identify. Some of them could have been from milling stones or metates. One small rounded piece of white sandy chalk came from the site.

WORK IN BONE

Worked bone was rare at the Nichols Site. Five pieces of scapulae were found which showed use, probably as digging tools. Awls were the next most common bone artifacts. One complete awl and a portion of another were of the flat, broad, split-rib type. These had been well made and showed much use. Another awl or punch triangular in cross section was also found. This specimen tapered less abruptly to a point than do many artifacts of this type. Two bone beads were found at the site. One was 6.5 cm. long and varied in maximum diameter from 0.8 to 1.1 cm. One end showed part of the expanding section near the articulation. The other was nearly cylindrical. It was 4.5 cm. long and 0.8 cm. in maximum diameter.

An eyed bone needle or band also recovered from the site is 0.9 cm. wide and 0.2 cm. thick. The portion of the specimen remaining is broken in four pieces which altogether measure about 11.5 cm. in length. The end appeared to be an old break. There is slight variation in width along the length of the specimen, but there is no evidence of its having tapered. The eye is 0.2 cm. in diameter and 0.5 cm. from the end which has been somewhat smoothed and rounded. Three fragments of antler may have been worked or cut, but no definite shape is observable.

TRADE MATERIAL

One small fragment of iron is included in the Historical Society collection from the site. The piece is irregular in shape, about 2 cm. across and 0.3 cm. thick.

DENDROCHRONOLOGY

Dendrochronological examination of the charcoal from the Nichols Site made it possible to establish an outside date of 1709 (Hill and Metcalf, 1942, p. 205). This date was arrived at on the basis of a master chart established at North Platte, Nebr.; because of the distance between the two localities, Mr. Weakly, who made the study, states: "I do not consider the above dating as entirely reliable and conclusive."

The assignment of the Nichols Site to the Stinking Water Focus of the Dismal River Aspect has been previously suggested (Hill and Metcalf, 1942, p. 221). Such an assignment seems entirely justified on the basis of the present examination of the material recovered. It seems highly desirable that additional work be done at this site, especially since painted southwestern sherds have been found there.

SITE 25FR15

The easternmost Dismal River site yet discovered is in Franklin County, just west of the mouth of Cottonwood Creek and about a mile west of Bloomington, Nebr. The site was located originally by a local collector and was revisited by a survey party from the University of Nebraska, Laboratory of Anthropology, in the summer of 1949. The site is on a high terrace overlooking the Republican River to the south and Cottonwood Creek to the east. The pottery recovered consisted of both Dismal River and Upper Republican sherds in about equal amounts. Stone was abundant at the site, but pottery was scarce. There were no stone artifacts especially diagnostic of Dismal River, but there was nothing in the general appearance of the stonework which would distinguish it from Dismal River material.

SITE 25FT9

One of the first Dismal River sites to be mentioned in print was the Dick Site (Wedel, 1935, pp. 180–182), 25FT9, then known as Medicine Creek 5. Resemblances between the pottery from this site and sherds from some previously known but unreported sites on the Dismal River, on the Stinking Water near Wauneta, and at Signal Butte were discussed at that time.

The Dick Site was examined in the summer of 1934 by a party from the Nebraska State Historical Society, but only a few hours were spent there. The site is located on the top of a long, narrow erosion remnant between Brush Creek and Medicine Creek at their confluence about 2 miles west of Curtis, Nebr.

The pottery from the Dick Site was described by Wedel (1935, p. 180) as follows:

> Pottery was very dark gray to black in color. Paste was fine and black. Tempering consisted of very fine sand, sparingly used. Surfaces were well smoothed, the exterior being generally burnished and somewhat shiny. Perhaps a third of the sherds were lighter in color, and the exterior showed broad shallow tooling marks or basketry impressions. Rims were characteristically vertical and never collared. A collection of twenty-five rimsherds from this site, in the possession of John Adams, includes eighteen undecorated and seven decorated. The former, seen in profile, have a sharpish or flattened lip. Decorated rims usually have a slight thickening at the lip. Their treatment was usually with small diagonal incisions across the lip or else were repeated thumb impressions. Cord marked sherds were entirely absent.

Other artifacts found at the Dick Site and considered to be in association with the pottery were end scrapers and triangular or notched points. Unworked bison long bones were recovered and a bone awl was reported to have been found there previously. Five crudely made copper jingles were found in association with the pottery.

The only evidence of structures consisted of two fireplaces surrounded by a level rich in village detritus. No postholes were found. Hill and Metcalf (1942, pp. 208–209) report the occurrence of corn and bison scapulae hoes at 25FT9.

An examination of the site in 1949 failed to reveal any additional information. A few artifacts were found on the surface, but the condition of the soil was such that excavation was impossible in the limited time available.

SITES IN WESTERN NEBRASKA

SITE 25BN2

The University of Nebraska, Laboratory of Anthropology, has a few sherds from 25BN2, the Bull Canyon Site, which is located in the northwestern part of Banner County, Nebr. About a third of these sherds, including four rims, are Dismal River. One of the rims has a rounded, smooth lip. The paste is gritty and heavily tempered with medium-sized sand. The outer surface is smooth except for horizontal striations, which may be tool marks. This sherd is about 0.5 cm. thick and buff to black in color.

Another rim sherd has a rounded, smooth lip, somewhat flared to the outside. The rim appears to have been curved. The paste is black and gritty and contains a small amount of medium-sized sand tempering. The sherd is about 0.7 cm. thick and is smooth on the inside as well as the outside.

The lip of a third rim sherd is decorated with large, deep, round impressions placed close together. At these punctates, the lip is considerably thickened toward both the inside and outside. The paste is black, gritty, and fine textured, but one very large sand particle is in evidence. The sherd is 0.5 cm. thick.

The other rim sherd has a smooth, rounded lip which is thinned in one place and slightly thickened at another. This rim appears to have been curved and flaring. The paste is compact and gritty with a fine uniform texture. There is no evidence of added tempering material. Both inner and outer surfaces show horizontal striations, which may be tool marks. The surface of the sherd is buff and black, smooth on the inside and slightly rough on the outside. The sherd closely resembles pottery similar to Dismal River from Colorado. The association of this sherd with good examples of Dismal River pottery at 25BN2 strengthens the identification of the Colorado pottery as a variant of Dismal River.

Two body sherds have a gritty paste and contain only a little sand tempering. One has a black paste and an almost polished outer surface.

The Bull Canyon Site may be stratified. Both Upper Republican and Woodland pottery are found with the Dismal River pottery. The occurrence of three components as well as the presence of variant Dismal River pottery suggests that further work at the Bull Canyon Site might be very profitable.

SITE 25GD2

Ash Hollow Cave, or site 25GD2, is located 3 miles southeast of Lewellen, in Garden County, Nebr. The site is a small rock shelter located high in the east wall of Ash Hollow, a steep-walled valley whose mouth opens into the valley of the North Platte River. The cave, which contained deep, stratified deposits of cultural material separated by sterile zones, was excavated by the Nebraska State

Historical Society in 1939. The archeology was reported by John L. Champe (1946).

The upper level (Lens A) at Ash Hollow Cave, yielded a preponderence of Dismal River pottery, while only three Dismal River sherds occurred in the next two lower levels. The Dismal River pottery from the site is from 0.5 to 1.0 cm. thick with smooth surfaces, some of which show polishing or burnishing and a few of which feel slightly waxy. Other sherds feel gritty to touch. The paste is usually dark, although the surface color is predominantly buff with some sherds gray black. The paste is compact and gritty, tempered with a moderate amount of fine to medium sand. The lips are smooth and rounded. Judging from the rims, it would appear that portions of only two vessels were recovered from the site. One of these had a slightly recurved rim about 3 cm. high. The other vessel appears to have been a bowl or a vessel with an extremely high recurved rim. Perhaps the most striking feature of the pottery is that all the sherds represent one of the less common variants of Dismal River pottery. This fact is not necessarily significant if only two vessels are represented.

The rest of the artifacts from Lens A are not out of place in a Dismal River component. The short tubular beads from Lens A (Champe, 1946, p. 47) which were previously unreported from Dismal River sites have since been duplicated from site 25HO21. The occurrence of gravers at 25HN37 and 25HO21 has also been established.

The charcoal from Lens A at Ash Hollow Cave was found to represent the years 1587–1684 (Champe, 1946, p. 47). The terminal date, found on three specimens from the lens, plus an additional 20 years allowed to take care of outer rings which were burned away, would give an approximate date of 1704 for the last occupation of this level.

SITE 25MO2

The Pumpkin Creek Site, 25MO2, is located about 5 miles southeast of Bridgeport, in Morrill County, Nebr. The Laboratory of Anthropology has a surface collection from this site made by the Nebraska State Archeological Survey. The location, which is on record in the files of the Laboratory of Anthropology, was visited by the 1949 survey party but no cultural material was found. The site which is on the west side of Pumpkin Creek, slopes gently up from the creek and then more steeply until the high tableland is reached. Much of the area, which is now in pasture, appears to have been badly blown out at one time and has since grassed over. It seems quite likely that the material was collected during drier years when the blowouts were active.

The pottery in the collection from 25MO2 is about equally divided between Dismal River and Upper Republican. The Dismal River pottery is from buff to black, generally with a black paste, moderately fine textured and compact. The paste, which is gritty, contains a moderate amount of fine to medium sand tempering. Some of the sherds seem to have a slightly greater tendency to crumble under pressure than does the pottery from White Cat Village. Other sherds are equally as compact and cohesive as those from White Cat Village. The surfaces are generally smooth; some are gritty to touch; some are slick, and almost waxy. The majority, however, are rough, which could be due in part to their having been sand blasted. A very few sherds suggest simple stamping which has been nearly obliterated by smoothing. Since none of the sherds show definite simple stamping, it seems likely that these marks may be due to some other cause. One rim sherd appears to have been slightly flaring, with a smooth, rounded, slightly thinned lip.

The projectile points from the site would fit well into a Dismal River artifact inventory. They are almost entirely of the types NBa, NBa1, NBb, and NBb1. The materials represented are brown jasper, quartzite of various colors, gray flint, chalcedony, and obsidian. Obsidian is relatively abundant at this site.

The rest of the stonework, with the exception of some nicely chipped knives and knife fragments, is well within the range of stonework from other Dismal River sites. It consists chiefly of scrapers, choppers, knives, and modified flakes. One drill from the site is cigar shaped, with one end chipped down to a finer point. The larger stone specimens are of quartzite and jasper.

SITE 25SF1

A preliminary report of the excavations at Signal Butte, 25SF1, in Scotts Bluff County, is presented by Strong (1935, pp. 224–239). He reports the finding of pottery identical with the thin gray-black pottery from the sites on the Dismal River, 25HO1 and 25HO2. This pottery occurred with Upper Republican pottery in the upper level of this stratified site.

The site is located on a small isolated erosion remnant about 16 miles south and west of Scottsbluff, Nebr. Half of the site was excavated by Strong for the Bureau of American Ethnology in 1932. The other half was left for further testing at a later date, but relic collectors have destroyed the greater part of the upper level of the site.

SITE 25SX301

Several years ago Carl Spence, now deceased, sent small collections of pottery to the Laboratory of Anthropology from two sites near Crawford, Nebr. The exact location of the sites was not indicated, but they were named the Glenn Site and the Roundtop Site. The 1949 Laboratory of Anthropology survey party contacted several of Mr. Spence's associates in Crawford in hopes of learning the location of these two sites. Roy Viele recalled visiting a site about a mile west of Glenn, Nebr., with Mr. Spence, and supplied the party with the exact directions to get to the site.

The site, which has been given the number 25SX301, lies on a high terrace on the south side of the White River. The terrace drops off abruptly to the river in some places and overlooks a lower, narrow terrace at other points. The survey party found very little material at the site: a scraper, a few flint chips, and a small sherd which could easily be Dismal River. Mr. Spence had sent nine sherds, probably from this site, to the Laboratory of Anthropology. All these were black with a gritty, compact paste, lightly tempered with fine sand. The sherds were about 0.5 cm. thick and all quite small. One was a rim sherd with a smooth, slightly flattened lip. Both surfaces were smooth and in places appeared almost polished. Two other sherds were body sherds, smooth on the inside and decorated with rows of elongated punctates or tool marks on the outside (pl. 9, *f*). These marks were 0.3 to 0.4 cm. long and 0.2 to 0.3 cm. wide. Some of the sherds exhibited parallel rows of punctates which formed cross rows also. At least one sherd appeared to have the punctates arranged in a curved line.

SITE 25SX00

Howard Dodd, another associate of Mr. Spence, remembered their finding pottery on the top of, and around the edges of, an isolated erosion remnant about one-half mile southeast of Roundtop, a distinctively shaped hill which is a well-known landmark about 16 miles north and west of Crawford, Nebr. The survey party, however, could not relocate the site. The pottery which Mr. Spence had sent in from near Roundtop is of at least three types. The majority is cord roughened, resembling Upper Republican in paste and Woodland in surface treatment. Three rim sherds from the site appear to be Dismal River. One of these is black with a gritty, compact paste containing a moderate amount of fine sand tempering. The rim was apparently straight or slightly flared, about 2.5 cm. high and 0.5 cm. thick. The surfaces were smooth except for slight horizontal striations, probably tool marks. The other sherd, apparently from a miniature bowl, had a black, fine-textured, slightly laminated paste which was gritty and untempered. The sherd was 0.5 cm. thick with a smooth, rounded lip. Another small rim sherd was badly damaged but appeared to be from the same miniature vessel.

One thin, hard, orange sherd from the site is very much like some pottery from Glen Elder, Kans.

SITES IN NORTHEASTERN COLORADO

SITE COLO.D:4:2

From site Colo.D:4:2 the University of Denver has one sherd which looked like Dismal River pottery. The rest of the pottery was cord roughened. The site is a rock shelter in Larimer County, Colo., located near the Colorado-Wyoming line about 22 miles southwest of Tie Siding, Wyo.

SITE COLO.E:1:7

From site Colo.E:1:7 the University of Denver collection contains what appears to be good Dismal River pottery in texture, tempering, color, rim form, and thickness. There was, however, no indication of simple stamping. The rim sherds indicated a simple, slightly flaring rim, joining the body of the vessel in a smooth curve. The lips were rounded and smooth with a slight thickening which varied from 0.5 cm. to 0.9 cm. The surface of the rims, both inside and outside, was slightly rough but showed no signs of manipulation except for some horizontal toolmarks. Many of the sherds, both body and rim, had a thin buff deposit on the outer surface and broken edges. This layer fails to dissolve in either acid or water and seems to represent a deposit formed on the sherds while they were in the ground, which for some unknown reason failed to adhere to the inner surface. Other than for this coating, all the sherds are entirely black except for one in which the outer fourth of the sherd is buff, perhaps from refiring.

The sherds vary from 0.4 to 0.8 cm. in thickness. All are quite heavily tempered with sand. The paste has a very sandy or gritty texture when examined under a microscope.

Other pottery from the site closely resembled Dismal River pottery in all respects except that it showed neatly executed cord roughening. The paste when observed under a microscope contained very fine grit which could be indigenous in the clay from which the pottery was made. Although no cord-roughened pottery has ever been identified as Dismal River, the cord-roughened pottery from this site does resemble Dismal River pottery in many ways and has not been identified with any other known complex.

This site in Larimer County, Colo., about 17 miles north and west of Wellington, was visited by a party from the University of Nebraska in the summer of 1949 (Gunnerson and Gunnerson, MS., 1949). The site is located in a very rocky area just northwest of a small lake which appears to be fed by an intermittent stream. The area to the north and west of the lake is well above high-water level. The land then rises to a steep but symmetrical hill which is a readily noticeable feature of the landscape. The presence of a site in that area was corroborated by the landowner, but a surface reconnaissance failed to yield anything except numerous chips of flint, chalcedony, and quartzite. The soil is quite sandy and is for the most part grassed over. In drier years, more artifacts were probably exposed by wind blowing the sand away.

SITE COLO.E:2:1

The University of Denver had in its collection two sherds from site Colo.E:2:1. Both of these sherds fell within the range of Dismal River pottery. The site is located in the northern part of Weld County, Colo.

SITE COLO.E:7:1

The collection from the University of Denver's site, Colo.E:7:1, contained many sherds within the range of Dismal River pottery as known in Nebraska. Twelve Dismal River sherds from the site were borrowed for study; three of these were heavily mica tempered.

One rim sherd, which was mica tempered, showed definite simple stamping to within about a centimeter of the lip. The sherd appeared to be from a vessel which had either a slightly flaring rim curving smoothly into the body or an unusually high rim. The sherd was black with a thin buff mineral deposit on it. The paste is not especially compact and showed no tempering material except for much mica. The paste is, however, quite gritty and granular in nature. The simple stamping, which was nearly vertical, was not sharp, and the entire surface presented a rough appearance as though the paste was not fully plastic when the surface was manipulated. There is no evidence of the surface having been smoothed after manipulation. The inside of the sherd shows horizontal marks, probably from a tool used inside the vessel. The lip is thinned and smooth.

Two body sherds appear to have identical paste and surface treatment and could easily have been from the same vessel. One of these mica-tempered sherds has a slight angle as though it were the junction between the rim and the body. It shows diagonal simple stamping on the outside and horizontal lines on the inside.

The other rim sherd was black except for a thin mineral deposit. The rim was about 2.5 cm. high and straight. There was a slight but definite angle where the rim met the body. The sherd was 0.8 cm. thick and lightly tempered with sand. The paste was gritty and showed a very slight tendency to be flaky, although generally it was granular in nature. The lip was smooth and rounded. The surfaces showed horizontal marks probably left by a smoothing tool. The inside showed a general roughness.

One body sherd was definitely simple stamped in the Lovitt tradition; two others may have been simple stamped and the ridges later nearly obliterated by smoothing. The body sherds, with the exception of the mica-tempered ones, are tempered with medium to fine sand with an occasional inclusion of a larger particle. The paste is gritty, much like that of the pottery from southern Nebraska. The sherds range in thickness from 0.4 to 0.8 cm. They are generally black with a few showing a buff outer surface. Some of them have a thin buff-colored mineral deposit.

Colo.E:7:1 site is located in Weld County, Colo., about a mile and a half south of Cornish. The area considered to represent the site was scouted by the University of Nebraska survey party. Chips of quartzite, chalcedony, flint, quartz, and obsidian were found, but no pottery and only one piece of worked stone. There is evidence of a large blowout, now grassed over, which could represent the source of the collection, for the site was recorded as a blowout site.

SITE COLO.E:14:11

The collections of the University of Denver contain pottery resembling Dismal River from another site in Weld County, Colo.E:14:11, located about 5 miles east of Fort Lupton. A reconnaissance of the site failed to disclose any evidence of occupation.

SITE COLO.F:15:1

The University of Denver collection contained only one sherd from the site Colo.F:15:1. This sherd appeared to be Dismal River. The site is located in Washington County, Colo., 10 miles north and west of Akron.

SITE COLO.G:4:GEN.

A collection at the University of Denver from Sedgwick County, Colo., Colo.G:4:gen., contained two sherds which could possibly be Dismal River, along with cord-roughened sherds.

SITE COLO.G:16:6

The University of Denver had only one sherd from site Colo.G:16:6, which is located in Yuma County, Colo., 2 miles south and west from

Wray on the south side of the Republican River. The sherd is well within the range of Dismal River pottery.

SITE COLO.G:16:8

Another collection at the University of Denver from about 10 miles north of Wray, Colo., in Wray County, contains one sherd within the range of Dismal River and one cord-roughened sherd.

SITE COLO.K:5:1

The University of Denver's collection from site Colo.K:5:1 contains many very small sherds with a few larger ones which appear to be well within the range of Dismal River. The one rim sherd has a smooth, rounded lip. The six sherds studied were mostly smooth with a black gritty paste. Four contained little or no additional tempering material and the other two were moderately tempered with coarse sand. The outer surfaces of all the sherds tended to be somewhat rough in comparison with sherds from Dismal River sites in southern Nebraska. One of these sherds appeared to have been simple stamped. The site is in Summit County, Colo., and is identified by the number 5SU2 in addition to its number in the quadrangle system.

SITE COLO.K:8:2

The University of Denver kindly lent a few sherds from site Colo.K:8:2, in Jefferson County, Colo., 4 miles south of Morrison. Three of these sherds, two of which were rims, had black paste and a rather small amount of sand tempering. The paste was micaceous and somewhat gritty. The surface was nearly smooth but was gritty to touch. The lips were rounded and smooth. One rim was 2.5 cm. high and straight or slightly flaring. This pottery from Colo.K:8:2 may well represent a variant of Lovitt Mica Tempered, differing primarily by the inclusion of some smooth sand. The other pottery from the site was cord roughened and very heavily tempered with sand and rough grit. Three sherds had a bright-red outer surface and a buff inner surface.

SITE COLO.M:9:6

A few sherds in the University of Denver's collection from site Colo.M:9:6 appear to be Dismal River. This site is in Elbert County, about 6 miles east of Buick, and is known locally as the "boneyard."

SITE COLO.M:10:2

One rim sherd in the University of Denver's collection from Colo.M:10:2 could be Dismal River. The site is in Elbert County, Colo., 13 miles north and west of Limon.

SITE COLO.N:4:1

The collection from site Colo.N:4:1 contains two sherds which look very much like Dismal River. This site is in Yuma County, Colo., about 6 miles south of Laird and is described as being in loose sand, 3 miles from the north bank of the Arickaree River.

SITE 17

The University of Colorado Museum was able to supply information on five sites in Colorado from which pottery resembling Dismal River had come. The collections from these sites had been made by a collector who had taken care to mark the specimens according to the site they came from and to determine the exact location of such sites. The specimens and sites retain this collector's numbers.

Site 17 yielded one small sherd which looked like Dismal River pottery but the surface was badly sand blasted making definite identification impossible. The sherd contained buff and black layers and was tempered with medium fine grit. This site is located in Larimer County, Colo.

SITE 26

The pottery from site 26 resembles Dismal River pottery. In the collection were two buff sherds of medium thickness. They were grit tempered and contained a little mica. The surfaces of the sherds were smooth and appeared to have been slightly polished. One of the sherds had part of a handle which was about 1.3 cm. in diameter. White and blue glass beads had also been found at this site.

SITE 38

Site 38 yielded thin brownish pottery which very closely resembles Dismal River. The tempering was grit with a trace of mica. The surface showed some indication that it may have been simple stamped and then smoothed to almost a polish. The site is in Larimer County, Colo.

SITE 101

The pottery from site 101 was a dull-buff color and was well within the range of Dismal River pottery. It was tempered with fine grit and contained a little mica. The surface was smooth but not polished. The site is located in Boulder County, Colo.

SITE 104

There was a Dismal River rim sherd in the collection from site 104. The sherd was smooth and black and tempered with grit together with a little mica. The lip was smooth and rounded; the rim was slightly flaring. There were a few horizontal striations, probably tool marks, on the inside. The site is on the east side of a "hog back" just south of Mount Morrison.

LAFAYETTE SITE

H. H. McConnell, of Boulder, Colo., has pottery which resembles Dismal River pottery from three sites. One site about a mile east of Lafayette, Colo., yielded both Dismal River pottery and cord-roughened pottery, as well as a few sherds which may have had a southwestern origin. The Dismal River sherds are smooth and contain a little mica. One Dismal River rim sherd was decorated with incised diagonal lines. An attempt was made to relocate this site but without success.

BYERS SITE

Mr. McConnell also had Dismal River pottery from a site about 10 miles north of Byers, Colo. The surface of some of this pottery was smooth. The surface of the rest was slightly irregular but not simple stamped.

BOULDER SITE

A few sherds resembling Dismal River pottery had been found on a site about 9 miles east of Boulder. Most of the sherds from this site, however, were cord roughened. There was a trace of mica in both the cord-roughened and Dismal River sherds.

TILDEN SITE

R. W. Haynes of Fort Lupton, Colo., has Dismal River pottery from four sites in that vicinity. Pottery from the Tilden Site, about 4 miles north of Hudson, Colo., is well within the range of Dismal River pottery but tends to be relatively thick. The outer surfaces are smooth, although a few sherds may have been simple stamped and then smoothed over. The paste is generally black with fine grit tempering and traces of mica. The outer surfaces are buff to black in color and the inner surfaces are buff to gray. A little obsidian was also found at this site.

"B. AND M. SITE"

The "B. and M. Site," about 3 miles northeast of Hudson, Colo., also yielded Dismal River pottery. The color was black to gray and the sherds varied from medium thick to thick. They were grit tempered, some showing traces of mica. The surfaces are generally smooth and, on one sherd, somewhat polished. Some obsidian was found at this site.

WELD SITE

A Dismal River rim sherd was found at a site northeast of Weld, Colo. The lip is slightly thickened to the inside. The surface of the sherd is buff and the core is black.

WELD COUNTY GENERAL SITE

Mr. Haynes has Dismal River pottery from another site in Weld County, Colo. The sherds from this site are both smooth and simple stamped. The sherds are relatively thin (about 0.4 cm.) and lightly tempered with fine grit and an occasional piece of larger grit. All the sherds contain mica, some more than others. The sherds are for the most part black; a few are buff or buff on the outside and black on the inside.

STERLING SITE

The Nebraska State Historical Society has a small collection of potsherds from a site in Logan County, Colo., about 6 miles northwest of Sterling. Two sherds from the collection are identifiable as Dismal River pottery. Most of the pottery from the site, however, is cord roughened, and may be some variant of Woodland.

SITES IN SOUTHEASTERN COLORADO

SITE COLO.S:12:5

A rim sherd in the University of Denver's collection from site Colo.S:12:5 closely resembles certain Dismal River sherds (pl. 9, *d*). This sherd appears to be from a vessel about 10 cm. in diameter at the neck with a flaring, somewhat curved rim. The sherd is 0.5 cm. thick, has a black gritty paste, and is tempered with moderately fine sand. The lip is smooth and round. Both surfaces are smooth and feel somewhat polished. The outer surface on the shoulder area is decorated with rows of elliptical punctates. The rows, which are not quite evenly spaced, appear to be horizontal and start about 1.8 cm. from the lip. The punctates are about 0.2 by 0.3 to 0.4 cm. in size. There is also a fine incised line parallel to and just below the lip on the outside of the vessel. The site is in Pueblo County, Colo. The exact location is on record at the University of Denver.

SITE COLO.Y:12:GEN.

The University of Denver had some material from the area Colo.Y:12:gen. Two smooth black sherds from this area are well within the range of Dismal River pottery.

SITE COLO.U:5:9

The University of Denver collection from Colo.U:5:9 contained a few sherds which could be Dismal River, together with coiled and painted southwestern pottery. Of the four pieces of pottery resembling Dismal River which were borrowed for study, three were badly sand blasted and the fourth was very small. All were black to dark gray and contained a moderate amount of sand tempering. The paste was gritty and very compact. The one sherd that was not sand blasted had a buff mineral deposit which obscured the surface color. A fresh break indicates that if any color other than black is present it is extremely thin. The outer surface is nearly smooth and somewhat polished. There are very slight parallel ridges which may represent simple stamping which has been smoothed out. The site is located in Cheyenne County, Colo., about 17 miles northwest of Eads.

SITE COLO.Y:13:1

A study collection of pottery from site Colo.Y:13:1 was borrowed from the University of Denver. Both cord-roughened and smooth sherds are present, the two types showing considerable difference in paste and tempering as well as in surface treatment. The smooth pottery does not differ greatly from Dismal River pottery as found in Nebraska. The paste is black and sand tempered. It is not quite as gritty and is a little more cohesive than the Dismal River pottery from southern Nebraska. This could, of course, represent individual variation or variations in the material available. The hardness is between 4 and 6. One thinner sherd showing tool marks on both surfaces contains a moderate amount of finely divided mica. The site is close to the southern boundary of Colorado about at its center. The exact location is on file at the University of Denver.

SITE COLO.Y:14:1

Another site in the same area, Colo.Y:14:1, yielded pottery resembling Dismal River as well as coiled and cord-roughened sherds. The outer surface of at least one coiled sherd appears to have been vitrified. Of the eight sherds borrowed for study from the University of Denver, two appear to be well within the range of Dismal River pottery. Two other sherds resemble Dismal River pottery. The paste of the two sherds most like Dismal River is somewhat more compact and less gritty than most Dismal River pottery as it is now known. The sherds contain moderate amounts of sand. Their surfaces are smooth and appear to have a slip or pseudoslip on one or both surfaces. The color ranges from buff through black, with variations on a single sherd. The two sherds resembling Dismal

River pottery less closely are cruder and rougher in appearance with very large sand particles for tempering. The paste is black and somewhat gritty. One of these sherds is a rim sherd with a smooth, rounded, slightly thinned lip. The rim appears to have been slightly flared. The outer surfaces show horizontal striations which may have resulted from shaping the vessel. This site is located in Costilla County, Colo., near Las Lauces and near the Rio Grande River.

COLO.Z:5:7

The University of Denver has five sherds from site Colo.Z:5:7, one of which looks very much like mica-tempered Dismal River pottery. The site is in Huerfano County, Colo.

COLO.Z:6:1

Some of the sherds from site Colo.Z:6:1 resemble Dismal River pottery. One is a highly micaceous rim sherd. The lip is rounded, slightly thickened, and smooth. The paste is gray in color and somewhat flaky from the large amounts of mica. The surfaces are slightly rough to touch. A smooth gray ware is also present in the collection. The paste of this is more compact and less gritty or granular than that found in most pottery definitely identified as Dismal River. The surface may be slightly rough to touch or smooth with a slight indication of polish. Red and buff painted pottery also came from the site.

COLO.Z:14:2

The sherds that the University of Denver has from site Colo.Z:14:2 fall well within the established range for Dismal River pottery. The paste is black, moderately compact, and somewhat gritty or granular. It contains a moderate amount of fine sand tempering. One rim sherd has a rounded, slightly thinned lip and appears to have been curved and slightly flaring. Both surfaces are nearly smooth, although the inner surface is somewhat the rougher. One small body sherd is polished on both surfaces. On one surface there is a trace of burned black deposit similar to that found on many other Dismal River sherds. Another small body sherd has the outer surface decorated with oval punctates about 0.7 cm. long and 0.2 cm. wide. These appear to have been arranged in rows parallel to the long axis and in cross rows at not quite right angles. There is evidence of a little smoothing of the surface after the punctates were impressed. The other surface is smooth and shows some polish. Another body sherd shows a few striations on the outer surface but nothing which resembles simple stamping. The surfaces of this sherd are slightly rough to touch. This site is in Las Animas County, Colo.

SITES IN SOUTHEASTERN WYOMING

SITE 48PL11

The Smithsonian Institution has in its collection from site 48PL11 some pottery very suggestive of Dismal River. The site, located in Platte County, Wyo., near the Platte River, apparently is a multicomponent site, and since all the pottery and most of the other material in the collection is from the surface, nothing can be said as to the association of pottery with other artifacts.

Four of the sherds are relatively thick, ranging from 6 to 12 cm., and are nearly smooth. The surface has a suggestion of polish. The paste is black, fine textured, gritty, and moderately tempered with small- to medium-sized sand. The sherds contain a little mica, which gives the surface a slightly spangled appearance. The surfaces of the sherds appear gray to buff. The lighter color is due in part, at least, to a thin mineral deposit which adheres to both the surfaces and the edges of the sherds. One rim sherd indicates a straight or slightly flared rim with a smooth, rounded, slightly thinned lip. The pottery is somewhat reminiscent of the thick, smooth pottery found in restricted amounts at most Dismal River sites and exclusively at Ash Hollow Cave. It is very similar to some of the pottery from the Bull Canyon Site in Banner County, Nebr.

Two smaller sherds from 48PL11 are much more like the majority of the Dismal River pottery. One of these sherds is smooth on the outside with a few very fine striations on the inside. It is black and about 0.5 cm. thick. The paste is very compact, gritty, and contains a little fine sand tempering. The other sherd is of about the same thickness but is buff in color. The paste is a little less compact, but is still gritty. It is quite heavily tempered with medium to coarse sand.

Even though all the pottery can be duplicated from other Dismal River sites, there is too little evidence to warrant the assignment of this site to the Dismal River Aspect. It seems likely that further investigation would justify such an assignment.

SITE WYO.U:11:1

The University of Denver collections include Dismal River pottery from two sites in Wyoming. Site Wyo.U:11:1 contained one and what may be another Dismal River rim sherd. In addition to these sherds, much cord-roughened pottery came from the site. The site is in Goshen County, Wyo., about 15 miles north of Lingle.

SITE WYO.AA:6:1

The other site in Albany County, Wyo., from which the University of Denver has secured Dismal River pottery is Wyo:AA:6:1. The pottery from this site is relatively thick, measuring from 0.5 cm. to 1.2 cm. The color ranges from buff to black. The paste is gritty and moderately compact. Except for this grit, the only tempering material consists of occasional chunks of broken rock. One sherd had a somewhat polished appearance but the rest were rather rough to touch. The sherd with the polished appearance has the more compact paste. The pottery from this site is much like Dismal River pottery from Ash Hollow Cave, 25GD2, and the Lovitt Site, 25CH1.

SITES IN SOUTHWESTERN SOUTH DAKOTA

SITE 39FA45

The occurrence of Dismal River material in South Dakota is as yet unverified. The Smithsonian Institution has, however, recovered a few sherds from Fall River County, S. Dak., which are suggestive of and fall well within the range of Dismal River pottery. These sherds were recovered during the intensive testing of sites to be destroyed by the Angostura Reservoir. One sherd from site 39FA45 appears to be from the shoulder area of a Dismal River vessel.

SITE 39FA83

Site 39FA83 yielded three sherds within the range of Dismal River pottery. The paste of these sherds was fine textured, gritty, and contained fine sand tempering. One relatively thick sherd with a smooth surface appeared to be from a miniature vessel. The surface of another thinner sherd appeared slightly scaly.

SITE IN WESTERN KANSAS (14SC1)

Site 14SC1, or the Scott County, Kans., Pueblo Site is located 15 miles north of Scott City, Kans., in the valley of Beaver Creek on the west side of the stream. The seven-room pueblo, along with some surrounding features, was excavated in 1898 by Williston and Martin (1899, pp. 124–130; Martin, 1909) and was considered by them to represent the ruins of Quartelejo, referred to by early Spanish explorers.

Some of the pottery from this excavation in the collections at the University of Kansas has recently been identified by Tichy and indicates a late 17th century date for the site (Smith, 1949, p. 295). The sample of sherds includes Tewa and Pojoaque Polychrome, "Kapo" black ware, late red wares, and Rio Grande culinary wares. Some of the sherds from the site previously classified as Dismal River were identified by Tichy as "late Rio Grande micaceous culinary ware" (Smith, 1949, p. 295).

It is interesting to note that most of the artifacts illustrated by Martin (1909, pls. VII–IX) would not be out of place among artifacts from Dismal River sites, although presumably most, if not all, of the specimens were found within the pueblo.

In 1939, the Smithsonian Institution conducted further excavations at 14SC1. With regard to this work Wedel (1940 a, p. 83) states:

> Traces of a seven-room pueblo ruin opened by Williston and Martin in 1898 were relocated. Middens yielded potsherds and artifacts of stone, bone, and horn, as well as rare objects of copper, iron, and glass. Charred maize, and squash or gourd rinds indicate horticulture, but quantities of animal bones suggest that subsistence was primarily by hunting. Contrary to expectations, Puebloan influences were almost negligible. Aside from the stone-walled ruin and nearby pre-white irrigation ditches there was a bare handful of sherds, some painted, and a few incised clay pipe fragments presumably attributable to late Southwestern stimulus. Numerous bell-shaped roasting pits and large irregular trash pits, as also the great bulk of artifacts recovered, show close relationship to sites of the protohistoric Dismal River culture of southwestern Nebraska. No houses of indigenous type were found.

Wedel (1947, p. 151) also reports that a pipe fragment identified as of late Rio Grande style was found associated with Dismal River material and is thought to date from the latter part of the 17th century to the early part of the 18th century. He also states (ibid., p. 151) that—

> A very few shell-tempered "Quiviran" sherds in the Scott County Site suggest a slight degree of direct intercourse and partial contemporaneity between Dismal River and Great Bend people . . .

The 1949 Laboratory of Anthropology survey party visited the Scott County Pueblo Site. It was covered with weeds but small pottery sherds, pieces of stone, and bone fragments were to be found in the loose dirt around animal burrows and in the ruts in a trail around the monument which marks the site of the pueblo excavated by Williston and Martin. The sherds found were all Dismal River, and closely resemble pottery from the sites in southern Nebraska. One sherd with a buff surface may have had black paint applied. A projectile point, type NBb, an end scraper, an expanded-base drill, and the point of another drill were also found.

DISMAL RIVER RELATIONSHIPS

PLAINS-DISMAL RIVER RELATIONSHIPS

The Dismal River Aspect has little time depth in the Plains. A 50-year period centered at about 1700 includes all the dated sites. Moreover, there are no known archeological complexes in the Plains which could be ancestral to Dismal River. Sterns Creek Woodland has been suggested as an ancestor (Martin, Quimby, and Collier, 1947, pp. 331–332) but there is no evidence to support such a speculation. Champe (1949, p. 291) has already refuted this suggestion.

The Dismal River area contains little evidence of other complexes contemporaneous with, or just preceding, the Dismal River Aspect. Much of the area had formerly been occupied by Upper Republican people, who utilized it much more intensively for agriculture. The Upper Republican occupation, however, was terminated just prior to a severe drought which may possibly be correlated with the great drought in the Southwest at the end of the 13th century.

The only sites which seem to date from after the Upper Republican but before the Dismal River occupation are those variously designated as "White Rock," or "Glen Elder" (Stephenson, 1954, p. 20). These sites are, for the most part, located along the eastern edge of the Dismal River area, although Wedel (1947) reports the occurrence of pottery similar to that from such sites from near Sundance, Wyo. Several sites in northern and northwestern Nebraska have Dismal River and "Glen Elder-White Rock" pottery occurring together on the surface. Contemporaneity of the two complexes in this area has been neither established nor disproved.

The "Glen Elder-White Rock" material is probably the older, and may represent a Siouan group that skirted the Pawnee territory in eastern Nebraska.

It is now generally agreed that the Dismal River people were Plains Apache. Thus far, however, it has not been possible to definitely identify any archeological site as a specific village described in early historical accounts, although it is likely that the Scott County, Kans., Pueblo Site was one of the rancherias of El Quartelejo. These rancherias were scattered; some were several days' journey from the large Quartelejo Apache settlement called Santo Domingo by the Spanish. Spanish sources state that the houses built by the original Taos refugees about the middle of the 1600's were found at Santo Domingo (D. A. Gunnerson, 1956, p. 355); therefore Santo Domingo was probably the original "El Quartelejo." But the Picuris who fled to the Plains in 1696 were, by 1706, scattered among several Quartelejo Apache rancherias. One of these, Sanasesli, was 40 leagues from Santo Domingo (Thomas, 1935, pp. 70–71). The Dismal River site in Scott County, Kans., is probably one of the Quartelejo rancherias at which Picuris Indians were living circa 1696–1706, rather than the original "El Quartelejo." This idea gains strength from the fact that pueblo sherds from the Scott County site "confirm a late seventeenth and early eighteenth century dating" (Wedel, 1949 b, p. 329).

The Dismal River Aspect shares enough traits with its Plains contemporaries so that it can be considered a Plains complex, even though—judging from its trait list—a poverty-stricken one. It might be said to have an alien base with a thick veneer of Plains traits, some of which were not wholeheartedly accepted. Many Plains-Dismal

River similarities seem to represent borrowing by the Dismal River latecomers. (Athabascans are known to be adept at this.) Of course, many of the traits shared by the Dismal River people and such protohistoric groups as the Lower Loup (Pawnee) (Wedel, 1938, pp. 6–9) and the Great Bend (Wichita) (Wedel, 1942, pp. 3–6) are by no means restricted to these groups nor to the protohistoric period.

The most specific protohistoric Plains trait found in the Dismal River complex is that surface treatment of pottery which has been called simple stamping. (It involves the use of a grooved or thong-wrapped paddle.) This trait is most commonly found at sites in the eastern part of the Dismal River area, where these people were probably influenced by the people of the Lower Loup Focus and the Great Bend Aspect, who also employed the technique. However, some highly micaceous sherds reminiscent of Taos ware, but simple stamped, occurred in Colorado. The Dismal River people formed their pots by the paddle and anvil method, apparently without coiling. This links them to the Plains, as opposed to the Southwest. The paucity of handles suggests affinity with the Wichita (Wedel, 1949 a), although it could just as well reflect non-Plains (possibly Southwest) influence. Vessel shape is somewhat similar to that of the Wichita, but even more to Taos-Apache-Navaho wares.

In brief, Dismal River pottery seems to present a non-Plains pottery tradition modified by the incorporation of the Plains technique of surface treatment called simple stamping.

The Dismal River house is not the Plains earth lodge. Nowhere else in the Plains has a pattern involving five basic posts been found. In Dismal River houses the center posts form a ring with a diameter about half that of the house. This trait is characteristic of many Plains earth lodges, but it is by no means limited to the Plains. Nor are the central fireplace and the eastern entrance. It is possible that the Dismal River house represents a compromise between the Plains earth lodge and a type of dwelling known earlier to the Apache, such as the Navaho hogan (one style of which has a basic pattern of three main posts plus two entrance posts) (Mindeleff, 1898, pp. 489–493).

The Dismal River baking pit is alien to the Plains, and the typical Plains cache pit is not found at Dismal River sites. Sunshades have such wide distribution that they are of little value for comparative purposes. Other Dismal River artifacts could, for the most part, be lost in Plains assemblages. A few which are peculiar to Dismal River as compared with other Plains complexes are: end scrapers with tangs or graver points, "cigar-shaped" drills with lateral lugs, tubular pottery pipes, and much-polished bone punches. The great number of cutting, chopping, and scraping tools with a minimum of work except on the use edge is also distinctively Dismal River. A notable absence from the Dismal River assemblage is the Catlinite pipe, a protohistoric and historic time marker in the eastern part of the Plains.

Dismal River shares with contemporary Plains groups such items as bison scapula hoes, bison metapodial fleshers, bone and antler projectile points, bone awls, tubular bone beads, bone arrow-shaft wrenches, cancellous bone paint brushes, bone paint (?) spatulas, small triangular flint projectile points, chipped end scrapers, side scrapers and knives, and grooved sandstone shaft polishers. Dismal River differs from other Plains complexes in the degree to which these various items are emphasized. In the Dismal River assemblage, for example, the common snub-nosed scraper outnumbers all other stone artifacts by a wide margin and bison scapula hoes are not common.

PECOS-DISMAL RIVER RELATIONSHIPS

Many of the artifacts from Pecos (Kidder, 1932) show a striking similarity to those of the Plains in general and to those of the Dismal River Aspect in particular. The types of bone artifacts, and even the variations, coincide to a large extent. The item most conspicuously lacking in the Pecos series is the scapula hoe or digging tool; only one dubious specimen was present.

Kidder describes 10 types of awls well represented at Pecos. They are classified as mammal leg bone, mammal rib, and bird bone, with subclassifications according to the portion of the bone used. The Dismal River inventory includes all these types except for awls with all or part of the articulation remaining, and those made from bird bones.

The Pecos collection contains a series of bone tools classified as "four-sided tools" (flakers (?), polishers (?), and rubbing (?) tools) which vary in shape, but somewhat resemble very blunt awls showing much wear and/or polishing. Many of these may be reused awls. Similar artifacts occur at Dismal River sites and have been called punches or flakers, or have been discussed as awls. Such tools are apparently not common in other complexes in the Southwest or in the Plains. They do, however, occur in the Promontory (Utah) complex.

Articulated metapodial fleshers, with and without serrations on the blade, occurred at Pecos in post-Columbian deposits. These artifacts are known from many Plains complexes including Dismal River, from the Promontory complex, and, in historic times, from much of the Plains and Midwest. Kidder recognized that these fleshers from Pecos were of Plains type. Similar tools or scrapers made of other bones also occur in both the Dismal River and Pecos complexes.

Cylindrical bone beads are common to Pecos and Dismal River. Spatulalike tools show more elaboration at Pecos as what Kidder terms spatula awls. Head (?) bands of bone or antler occur in both complexes, some types being common to both and others not. Miscellaneous ornaments of bone, antler, and bear claws occur in both. Flageolets and whistles are well represented at Pecos, but are much less common in Dismal River. Shaft wrenches and eyed needles occur in both complexes. Projectile points of bone and antler are represented by both socketed and stemmed types in both complexes. Another shared trait is the use of cancellous portions of large bones, which at Pecos are found in the later deposits.

A few items of bone represented at Pecos which have not yet been reported in Dismal River are spindle whorls, musical rasps, and objects identified as weaving and matting tools. The Pecos bonework shows more elaborate decoration, and there are more objects probably intended for ornaments than in Dismal River. Objects made of shell, especially beads and ornaments, are numerous at Pecos but rare in Dismal River.

The stone industry of Pecos is much like that of the Dismal River Aspect. The ground-stone industry, however, was better developed at Pecos. Also, the crude choppers common at Dismal River sites are not reported from Pecos.

Projectile points from Pecos represent a great variety of types, but the triangular points, with and without side notches, predominate as in Dismal River. The types of drills are nearly duplicated in the two assemblages. This is especially interesting since the plain-shafted or "cigar-shaped" drills and the same type of drill with lateral projections seem to be restricted in the Plains to Dismal River. The variety of knives, ranging from well-made leaf-shaped and alternately beveled diamond-shaped blades to incidental flakes showing use as cutting tools, is comparable in the two complexes. End scrapers and side scrapers are common in both complexes although there is no indication that any of the scrapers from Pecos are as crude as some from Dismal River, nor is there any indication that tanged scrapers were found at Pecos. Kidder noted a radical increase, beginning circa 1550, in the number of snub-nosed scrapers, side scrapers, and "two-edged" knives (alternately beveled) in the later deposits. This he interpreted as due to increased Plains influence. Among the aberrant flint forms from Pecos were rectangular objects similar to gun flints, which are reminiscent of one specimen from 25HN37.

Although ground-stone artifacts are much more common and varied at Pecos than at Dismal River sites, a few types are shared. The most common of these are sandstone abraders, especially arrow smoothers. Other types found in both complexes but more numerous at Pecos include metates, grooved mauls, hammerstones, tubular and elbow pipes, pendants, and beads, especially turquoise.

A reexamination of Pecos pottery failed to reveal any sherds indisputably Dismal River. Some of the plain black-ware sherds could be confused with Dismal River pottery, but, on the other hand, these fit smoothly into the Pecos series. One sherd, however, is worthy of special mention. It is smooth, black, and decorated with rows of elliptical punctates. Such sherds (pl. 30, *e, f*) are rare, but do occur at widely scattered Dismal River sites, coming from as far north as Sioux County, Nebr. Another sherd of this type, found at Taos, had apparently eroded out of the adobe of the old ruined mission that was completed in 1726.

Tubular clay pipes shaped like specimens from Pecos, but much less ornate, are found at some Dismal River sites.

In considering the similarities between the artifacts of Pecos and those of the Dismal River Aspect, one must keep in mind the time factor. The dates for Dismal River sites have thus far clustered around 1700. Pecos was occupied for several centuries and many of its artifact types apparently persisted for much or all of this time. For other specimen types, the age is not known, especially where few examples are found. It is interesting to note, however, that Kidder attributes many of the Plains-like and least southwestern types to relatively late phases (post-Columbian and later) of the occupation. A fuller discussion of the probable significance of this increased influence from the Plains is given by D. A. Gunnerson (1956, p. 349). She suggests that the influx of Plains artifacts which began at Pecos about 1550 was a result of interaction between Pecos people and the Teya and Querecho. Moreover, she presents evidence which suggests that the Teya were the direct ancestors of the Lipanan Apache, including the now-extinct Cuartelejo Lipanans. It would appear, from her evidence, that Lipanans have been trading at Pecos, and sometimes living there, from circa 1525 to at least as late as 1752. Moreover, until the Comanche invasion forced the Lipanans out of most of "Apacheria," those Apache seem to have virtually monopolized the Pecos-Upper Rio Grande Pueblo trade. Most of the Plains material found at Pecos, then, is probably of Lipanan origin. How much of it is specifically traceable to Pecos interaction with Lipanans of the Dismal River Aspect can probably not be determined. During the winter of 1751–52, 300 men of the Cuartelejos, Palomas, and Carlanas were "in the environs of the Pueblo of Pecos with their families, living so sociably and neighborly as to indicate their general love for this province. Leaving their women and children in the Pueblo of Pecos, they are accustomed to go to the Plains to hunt buffalo for their support" (Velez, *in* Thomas, 1940, p. 124).

The area around Pecos and the Upper Rio Grande Pueblos should be thoroughly examined for evidence of Dismal River campsites. There is a possibility that the Dismal River people, when in the Southwest, may have lost their veneer of Plains traits so that their sites will be hard to identify. However, if objects found also at Pecos, and apparently of Southwestern origin, were carried far into the Plains, it is at least possible that Plains artifacts were carried to campsites around Pecos and Rio Grande Pueblos, especially Taos and Picuris.

It is possible that some of the small open sites near Taos described by Jeancon (1929) may represent the sites of Dismal River people or other Lipanans, but his description of the material is too sketchy for an identification to be based upon it.

PROMONTORY-DISMAL RIVER RELATIONSHIPS

A reconsideration (Gunnerson, J. H., 1956) of material collected from caves on Promontory Point, north-central Utah (Steward, 1937) suggested that Promontory-Dismal River relationships may be much closer than previously realized. A few Promontory-Dismal River similarities had been noted before (Hill and Metcalf, 1942, pp. 188, 197), and Steward (1937) called attention to Plains traits at Promontory Point. Significant traits shared by the two complexes include: toothed bison metapodial fleshers, tanged end scrapers, sandstone arrow-shaft smoothers, tubular steatite pipes, blunt bone "punches" or "flakers," triangular projectile points, tubular bone beads, several types of bone awls, and bone spatulas. Both complexes are characterized by an abundance of end scrapers, great variation in the quality of stonework, and heavy dependence upon bison. Some Dismal River pottery is identical with part of the pottery from Promontory Point. Many of these traits are not found in other complexes in the Promontory area. Most are common in the Plains, but some are restricted, in the Plains, to the Dismal River Aspect.

The similarities between the two complexes are sufficiently numerous and specific to suggest that the Promontory culture is closely related to the Dismal River Aspect. The chief problem in comparing the two complexes is that the Promontory material is from caves whereas the Dismal River material is from open sites. It is likely, however, that open Promontory sites providing evidence of structures could be found. The intervening area, especially southern Idaho and Wyoming, should be surveyed in an attempt to locate additional sites related to these complexes.

At present there is no accurate date for the Promontory culture. Its similarities to the Dismal River Aspect suggest that it is contemporaneous with that Plains complex. The presence at Promontory of the toothed bison metapodial flesher, a protohistoric time marker in the Plains, strengthens the probability that the Promontory culture existed circa 1700. It is possible that the Promontory people were Dismal River buffalo hunters who followed bison herds up the North Platte River and into the Great Basin, where bison survived in the Promontory area until early historic times.

DESCRIPTION OF THE DISMAL RIVER ASPECT

SUBSISTENCE

The Dismal River people had a subsistence economy based primarily on hunting and secondarily on agriculture. Bison appears to have been the chief animal hunted, although numerous deer and beaver bones are also found. Turtles and mussels were utilized, but there is no evidence of fish and very little of fowl. The only indication of domesticated animals is the occurrence of dog bones. The presence of the skull and paw bones of a dog in a pit at 25CH1 suggests that dogs were eaten. The absence of fish bones is interesting in the light of the Athabascan taboo against the eating of fish and in view of the probable abundance of fish in the streams near the villages.

Evidence of agriculture is present but limited. Bison-scapula digging tools, which were probably used for cultivation of crops, have been found at several sites, and at 14SC1 there are irrigation ditches possibly attributable to the Dismal River occupation. More direct evidence of agriculture is present in the form of the charred remains of corn, and squash or gourd.

The Dismal River people apparently made use of wild plant foods. Remains of plums, chokecherries, hackberries, and black walnuts have been found.

TECHNOLOGY

The evidence that these people worked skin is indirect, but abundant. A large proportion of the chipped-stone artifacts such as scrapers and knives were probably skin-working tools. The same is true of the metapodial fleshers and the numerous bone awls. Some hemispherical pieces of cancellous bone found at 25CH1 were classified as hide tanners with the idea that they were used to smooth hides. The smooth pieces of caliche from several of the sites may have been rubbed on the hides to whiten them.

Bone tools appear to have been important to these people. Bone from several animals, as well as antler and horn, has been worked. The most common method of cutting bone appears to have been scraping or cutting partially into the piece and then breaking it. The scraps left from making awls and arrow points suggest that much of the shaping of these specimens was completed before the surplus bone was removed. The striations on some of the bone artifacts probably resulted from their having been shaped and smoothed by rubbing, in some cases with a rotary motion, against sandstone abraders. A few abraders have very narrow grooves which could have served to sharpen awls. Flint drills could have been used to drill bone.

A wide variety of stone was worked by the Dismal River people. The raw material chosen was usually that most readily available, although stone not native to the immediate area is often found at a site. The more common types of stone worked are: jasper, flint, chalcedony, quartzite, and sandstone. Other types of stone used, though not extensively, were: obsidian, schist, river boulders, quartz, turquoise, and, very rarely, catlinite. Pieces of caliche, hematite, and limonite show use but were apparently not fashioned into implements. The most common methods of working stone were by percussion and pressure flaking, although some grinding, pecking, and polishing was done. Antler tine and possibly bone flakers were used for pressure flaking and small stones showing use as hammer stones may have been used for the percussion flaking. In general, the quality of the stonework was poor, but the delicately chipped projectile points and drills demonstrate an ability to do good work. Well-chipped cutting edges or scraping edges occurred on tools otherwise shaped little or not at all.

The Dismal River people apparently chose clay with an abundance of very fine grit as the raw material for their pottery. They often added medium-sized sand as tempering and perhaps, occasionally, pulverized mica. The uniformly compact nature of the paste and the lack of lamination suggests that the paste was well worked. Shaping appears usually to have begun with lump modeling, followed by paddle and anvil shaping which in turn was sometimes followed by smoothing. The paddle used was probably either grooved or thong-wrapped, since it left ridges and depressions on the surface of the vessel. Firing was done in a reducing atmosphere at a temperature well under that necessary for vitrification but high enough to produce a reasonably durable ware.

Dismal River pottery is the artifact most diagnostic of the Dismal River Aspect. Single sherds from other complexes could be confused with Dismal River pottery, but there is little chance for confusion between series of Dismal River sherds and pottery from any other identified complex on the Central Plains. The most diagnostic traits of Dismal River pottery are its gray-black color, smooth or simple stamped surface, gritty paste, tendency toward straight square breaks, small sherd size, tempering (usually fine to medium sand or occasionally mica) and scarcity of decoration, which, when present, is almost always confined to the lips and consists of punctates and incised or impressed lines.

Only five restorable vessels have been found. All of these were from 25CH1 and were of approximately the same shape. The vessels are globular to somewhat elongated with a constricted neck. The rims are straight or flaring and meet the body of the vessel in a smooth curve. The vessels are small to medium in size with the largest only 23.5 cm. in both height and maximum diameter. Individual sherds and sections of vessels suggest several other forms, including bowls, bowls with constricted necks or the "seed-bowl" type, vessels with flat shoulders and recurved rims, vessels with flat bottoms, and miniatures.

Pottery shows regional variation. The smooth, thicker pottery found at Ash Hollow cave in western Nebraska becomes the predominant type in Colorado where simple stamped pottery is rare. Furthermore, at some of the Colorado sites, pottery very similar to Dismal River pottery, but with coarse tempering, occurs associated with what is probably Dismal River ware. This occurrence of coarse- and fine-tempered Dismal River-like pottery is reminiscent of Promontory ware and may be related to it.

Even in the area where the Dismal River complex is better known, there are some interesting variations. At the Hooker County sites the percentage of decorated rims and variety of lip decorations is significantly greater than at White Cat Village or the Lovitt Site, although at these latter sites the number of sherds collected was much larger. A portion of a vessel with a flat bottom and flaring walls, suggestive of Shoshone influence but with a mica-tempered paste, was found in Hooker County.

The Lovitt Mica Tempered sherd types pose another problem, since some of these sherds have also been identified as Rio Grande micaceous culinary ware. The uncommoness of such sherds at Dismal River sites might support the idea that micaceous ware had been obtained by trade if it were not for the fact that some of these sherds are simple stamped. Unmistakable painted Southwestern sherds have been found at Dismal River sites in Kansas and southern Nebraska.

One other tantalizing ceramic trait is the occasional occurrence of Dismal River sherds with parallel rows of elliptical punctates. The distribution of this type is from Pecos and Taos to north-central Nebraska, but with seldom more than one sherd at a site. The significance of this trait is not understood since nowhere does there seem to be a site where this type is at all common.

Clay and occasionally stone pipes were made. Pipes were of two types. The more common were the tubular or "cloud blower" pipes resembling those from Pecos but generally far less elaborate. The others are elbow shaped.

TOOLS AND IMPLEMENTS

Tools used by the Dismal River people were limited in variety and, for the most part, were of types used by other Plains groups. Chipped-stone projectile points were small, triangular, and well made, with and without side notches. Some chipped knives were well made, but crude choppers and retouched flakes were far more common. Drills were of several types; some had expanded bases; others were cigar shaped, and some were cigar shaped with lateral lugs, a type restricted in the Plains to Dismal River. Gravers and "spokeshaves" were not numerous and not standardized as to form. Both end scrapers and side scrapers are extremely numerous and one type, end scrapers with graver points or tangs, is diagnostic of Dismal River. Some chipped-stone artifacts were well made, but most were crudely executed except for the working edge.

Ground- and pecked-stone tools are far less common than chipped tools on Dismal River sites. Sandstone abraders are common and were apparently used for smoothing arrow shafts and for miscellaneous grinding such as sharpening bone awls and shaping bone tools. Other stone tools include shallow metates, and hammerstones.

Bone and antler tools were also important in the Dismal River complex. Bison-scapula hoes, although not numerous, were used. Fleshers were made from bison metapodials. Awls were made from several different bones and were of several types. Socketed antler and stemmed-bone projectile points were used. One distinctive type of bone artifact resembles a blunt awl and has been referred to as a "punch" or "flaker." For the most part such artifacts are well polished. Antler-tine flakers also occur. Other bone artifacts include eyed needles, bison-rib shaft wrenches, cancellous bone "paint brushes," bone "spatulas," head (?) bands, beads, whistles, and ulna picks.

STRUCTURES

Information on house structures has been obtained primarily from two Dismal River sites, White Cat Village and the Lovitt Site. Since the most common house type at White Cat Village is also found at the Lovitt Site, it seems justifiable to consider the typical Dismal River lodge as semipermanent, about 25 feet in diameter, probably with a covering of grass or brush over a 5-post foundation plus leaners, and built either on the surface of the ground or in a shallow excavation. Apparently some care went into the construction of these lodges since the central postholes are commonly arranged on an almost true circle. Judging from the size of the center posts, pains were taken to select relatively large posts of nearly the same size. The posts in turn were set deep enough in the ground to provide a substantial basis for a structure. Sometimes posts were wedged in their holes with bison long bones.

Dismal River houses do not appear to be closely related to other aboriginal Plains dwellings. It has been pointed out that Navajo hogans also have five posts. This similarity, however, is restricted to the number of posts since the three hogan foundation posts are slanted and the lodge is confined to the area within the five posts, whereas the postholes of the houses at White Cat Village were vertical and the diameter of the inner post circle represented only about half of the total diameter of the house.

The type of construction found in Wichita houses could probably be ruled out on the basis of the shallowness of leaner stains found in House VI at White Cat Village. The outer poles of Wichita houses were set sufficiently deep to permit their tips being bent and tied together.

The archeological evidence can probably be best interpreted in terms of a structure somewhat similar to the Plains earth lodge. The evidence suggests that five center posts about 9 feet high were set in a circle about 14 feet in diameter. Beams were then laid between the tops of adjacent posts. Two additional entrance posts may have been set about twice as far from the center as the main posts, and beams laid from these two posts to the central group.

Smaller poles were then pushed into the ground and leaned against the beams joining the central posts. The butts of these leaners were somewhat less than a foot apart, forming a circle with a diameter about twice that of the circle formed by the central posts. The leaners in turn were probably covered with grass or brush and possibly some dirt was banked around the lower portion. It seems likely that a roof would have been formed by laying poles across the top of the structure and then covering them with more brush or grass.

The smallness of the lodges would eliminate the necessity for an outer circle of posts joined by rafters to the inner circle and to the ground by leaners as in the case of the larger Plains earth lodges. The size of the houses did not seem to depend too much upon the size of the foundation. At 25CH1, the five center posts of House II averaged 0.3 foot in diameter and formed a circle about 11 feet in diameter. The smallest two of the six houses at 25HN37 were 12 feet in diameter with foundation postholes averaging 0.5 foot and 0.7 foot in diameter. The other four houses were 14 or 15 feet in diameter with postholes averaging 0.7 or 0.8 foot in diameter. These facts suggest that whatever the superstructure may have been, it could probably have been supported as well by small poles as by sturdy poles. Verification of the five-post pattern as typical of the Dismal River Aspect as a whole must await evidence of structures from other sites.

Two other variant structures are worthy of consideration. At the Lovitt Site one pattern of postholes suggested a rectangular sunshade supported by nine poles. At all Dismal River sites thus far excavated, there is a scattering of postholes with no apparent pattern. These could represent structures or racks of some sort.

A nine-room pueblo was found at 14SC1. It seems likely that this structure was built by refugee Pueblo people, but the possibility that it is of Dismal River authorship has not been completely ruled out.

Baking pits were found at three Dismal River sites. These pits are about 3 feet in both depth and diameter and were used for cooking green corn and perhaps other foods in large quantities. The pits, which often contain burned rocks, were heated by building a large fire in them; then the fire was removed and the food was placed in them. The pits would subsequently be filled with village refuse. Such pits are missing at Hooker County sites, where the ground is perhaps too sandy for such pits to have held their shape.

Refuse was also disposed of by filling shallow irregular pits scattered throughout the village. Whether these pits had other functions is not known. Midden areas also occur. The cache pits which are characteristic of most of the Plains agricultural complexes are missing at Dismal River sites. There is no direct evidence of large storage facilities.

ADORNMENT

No archeological evidence concerning the dress of the Dismal River people has been found, and very little indication of adornment. The latter is chiefly in the form of beads. The most common type of bead is made from tubular sections of bone with the length about five times the diameter. Such beads are often made of metapodials of dogs or coyotes and are usually from 3 to 5 cm. long.

Small turquoise beads have been found at several Dismal River sites. These undoubtedly represent commerce with other groups to the Southwest. Copper and iron conical jingles, commonly used by Plains and Southwestern Indians to decorate clothing and other equipment, are also found. Some of these appear to be of European manufacture while others were probably made by the Indians from such raw material as copper or brass kettles.

At least four pigments were available to the Dismal River people. Red hematite, yellow limonite, white caliche, and black charcoal have been found. Pieces of hematite and limonite show scraping, which suggests the production of powder. This was probably done to secure pigment, but it is impossible to determine whether or not it was actually used in body decoration. Cancellous bone "paint brushes" and spatulalike bone objects impregnated with red pigment have been found also. These could have been used for the application of paint.

EXCHANGE

There is evidence that the Dismal River people engaged in trade, but not very extensively. They received such things as metal jingles, iron awls, and possibly axes and guns from European sources either directly or indirectly. There is also evidence of trade with other Indian groups. Both Great Bend and Southwestern sherds have been found in Dismal River villages in southern Nebraska and Kansas. The occurrence of obsidian at sites might represent another commodity traded for, apparently in unworked form, since chips are found more frequently than artifacts. Turquoise beads were probably obtained from the Southwest. The occurrence at sites in Hooker County of artifacts made from brown jasper of a type found along the Republican River could be explained either by trade between closely related groups or by journeys to obtain the material.

RELIGION AND MORTUARY CUSTOMS

The only inferences as to the religion of the Dismal River people are drawn from negative evidence. The lack of fish bones in their villages, even though they were on streams which contained fish, could indicate a taboo against eating fish. The lack of evidence concerning burials of these people, even after careful search, could indicate a fear of the dead resulting in an avoidance of graves. This, in turn, may have prevented the burial of bodies near one another and probably caused them to be buried far from the villages. Both of these speculations are compatible with the practices of the southern Athabascans.

SUMMARY AND CONCLUSIONS

Numerous sites in the Central High Plains have yielded the archeological remains of a people who subsisted primarily by hunting, but supplemented the natural food resources of the area by the practice of horticulture. Those of the sites which have been dated belong to a 50-year period circa 1700. The complex of archeological traits represented at these camps and villages has been termed the Dismal River Aspect. The sites in the eastern part of the area of distribution are more closely related to one another than to sites in the western part of the area and have been grouped in the Stinking Water Focus. The westernmost sites may, with additional work, be found to constitute a second focus.

The archeological evidence indicates that the Dismal River people possessed essentially the same hunting and skin-working tools used by other Plains groups of circa 1700. The scarcity of tools commonly identified with aboriginal Plains horticulture and the absence of typical Plains storage pits leave their habits of food raising and storage in doubt. On part of their pottery the Dismal River people used a method of surface treatment commonly employed by their neighbors to the east, the Pawnee and Wichita.

Traits showing contact with the Southwest, though few, are equally specific: Pueblo trade sherds, turquoise, and drills with lateral lugs. Dismal River artifacts show striking similarities to those of Pecos, the only eastern pueblo from which comparative data are available. More surprising, in view of the intervening area, are the similarities between Dismal River and the Promontory culture in Utah. These are close enough to suggest that the Promontory culture represents Dismal River hunters who followed bison herds into the Great Basin.

The Dismal River lodge, as interpreted from the post pattern, remains unique; it is not Plains, Southwest, nor Basin.

The identification of the Dismal River people as Plains Apache brings with it explanations for many of the problems presented by Dismal River archeology. First, it permits us to identify the Dismal River Aspect as a final phase of Apache domination of the High Plains. It explains the fact that both Plains and Southwestern influences are detectable in the Dismal River Complex, for, since circa 1525, the Plains Apache had been familiars of both Pueblo and Plains agricultural villages. It is generally agreed that the Athabascans in the Southwest originated in the north, and it seems probable that they came via the High Plains circa 1525. The next major problem concerning these Apache groups is the identification of their earlier manifestations.

APPENDIX 1

Classification of the sites of the Dismal River Aspect

Site	Definitely assigned to the Dismal River Aspect	Tentatively assigned to the Dismal River Aspect	Assigned to Stinking Water Focus	Possibly representing Second Focus
25BN2	×			×
25C24		×		
25C27	×			
25C28	×			
25C29	×			
25CH1	×		×	
25CH7	×			
25CH8	×			
25CH14	×			
25DN1	×		×	
25FR15	×			
25FT9	×		×	
25GD2	×			×
25HN37	×		×	
25HN44	×			
25HO1	×			
25HO2	×			
25HO3	×			
25HO5	×			
25HO7	×		×	
25HO9	×			
25HO21	×		×	
25HO24	×			
25HO30	×			
25HO31		×		
25HO32		×		
25HY4	×			
25LN2	×			
25LN3	×			
25LN4	×			
25LN5	×			
25LN6	×			×
25LN7	×			
25LN9		×		
25LN10	×			
25MO2	×			
25SF1	×			
25SX00	×			
25SX301		×		
25TM1	×			
COLO.D:4:2		×		
COLO.E:1:7	×			×
COLO.E:2:1	×			
COLO.E:7:1	×			
COLO.E.14:11		×		
COLO.F:15:1	×			
COLO.G:4:gen		×		
COLO.G:16:6	×			

Classification of the sites of the Dismal River Aspect—Continued

Site	Definitely assigned to the Dismal River Aspect	Tentatively assigned to the Dismal River Aspect	Assigned to Stinking Water Focus	Possibly representing Second Focus
COLO.G:16:8	×			
COLO.K:5:1	×			×
COLO.K:8:2		×		
COLO.M:9:6	×			
COLO.M:10:2		×		
COLO.N:4:1	×			
COLO.S:12:5		×		
COLO.U:6:9		×		×
COLO.Y:12:gen	×			×
COLO.Y:13:1	×			×
COLO.Y:14:1	×			×
COLO.Z:5:7		×		
COLO.Z:6:1		×		×
COLO.Z:14:1	×			×
17		×		
26		×		
38	×			
101	×			
104	×			
B. & M	×			
Boulder		×		
Byers	×			×
Lafayette	×			
Sterling	×			
Tilden	×			
Weld	×			
Weld County gen	×			
48PL11		×		×
WYO.U:11:1	×			
WYO.AA:6:1	×			×
39FA45	×			
39FA83	×			
14SC1	×			

APPENDIX 2

SOURCES OF INFORMATION CONCERNING DISMAL RIVER SITES

Given below is a list of the sites mentioned in this paper which are either definitely or tentatively assigned to the Dismal River Aspect. The agency or agencies which have material and/or information concerning the site are also listed and are given in the approximate order of the amount of the material in their respective collections. The abbreviations for the agencies follow:

UNLA	University of Nebraska, Laboratory of Anthropology, Lincoln.
NSHS	Nebraska State Historical Society.
SIMRBS	Smithsonian Institution, Missouri River Basin Surveys, Lincoln, Nebr.
UD	University of Denver, Department of Anthropology, Denver.
UC	University of Colorado Museum, Boulder.
UK	University of Kansas Museum of Natural History, Lawrence.
HHM	Collection of H. H. McConnell, Boulder, Colo.
RWH	Collection of R. W. Haynes, Fort Lupton, Colo.
SI	Smithsonian Institution, Washington, D. C.

Sites definitely or tentatively assigned to the Dismal River Aspect and the agency having information concerning them

SITES IN NEBRASKA

Site	Other name of site	Agency
25BN2		UNLA.
25C25		NSHS.
25C27		NSHS.
25C28		NSHS.
25C29		NSHS.
25CH1	Lovitt Site	NSHS, UNLA.
25CH7	McCallum-Hofer Site	NSHS.
25CH8	Skelton Site	NSHS.
25CH14	Baker Site	NSHS.
25DN1	Nichols Site	NSHS, UNLA.
25FR15		UNLA.
25FT9	Dick Site	NSHS.
25GD2	Ash Hollow Cave	UNLA.
25HN37	White Cat Village	UNLA, SIMRBS.
25HN44		UNLA.
25HO1		NSHS.
25HO2		NSHS.
25HO3		NSHS.
25HO4		NSHS.
25HO5		NSHS, SIMRBS.
25HO7	Lowe Site	NSHS, SIMRBS.
25HO9		NSHS.
25HO21	Humphrey Site; Matthews Site	NSHS, SIMRBS.
25HO24		NSHS.

Sites definitely or tentatively assigned to the Dismal River Aspect and the agency having information concerning them—Continued

SITES IN NEBRASKA—Continued

Site	Other name of site	Agency
25HO30		NSHS.
25HO31		NSHS.
25HO32		NSHS.
25HY4	Horn Site	NSHS.
25LN2		UNLA.
25LN3		UNLA.
25LN4		UNLA.
25LN5		UNLA.
25LN6		UNLA.
25LN7		UNLA.
25LN9		UNLA.
25LN10		UNLA.
25MO2		UNLA.
25SF1	Signal Butte	SI.
25SX00	Round Top Site	UNLA.
25SX301	Glenn Site	UNLA.
25TM1		NSHS.

SITES IN COLORADO

COLO.D:4:2		UD.
COLO.E:1:7		UD.
COLO.E:2:1		UD.
COLO.E:7:1		UD.
COLO.E:14:11		UD.
COLO.F:15:1		UD.
COLO.G:4:gen		UD.
COLO.G:16:6		UD.
COLO.G:16:8		UD.
COLO.K:5:1	5SU2	UD.
COLO.K:8:2		UD.
COLO.M:9:6		UD.
COLO.M:10:2		UD.
COLO.N:4:1		UD.
COLO.S:12:5		UD.
COLO.U:5:9		UD.
COLO.Y:12:gen		UD.
COLO.Y:13:1		UD.
COLO.Y:14:1		UD.
COLO.Z:5:7		UD.
COLO.Z:6:1		UD.
COLO.Z:14:2		UD.
17		UC.
26		UC.
38		UC.
101		UC.
104		UC.
B. and M		RWH.
Byers		HHM.
Boulder		HHM.
Lafayette		HHM.
Sterling		NSHS.
Tilden		RWH.
Weld		RWH.
Weld County gen		RWH.

Sites definitely or tentatively assigned to the Dismal River Aspect and the agency having information concerning them—Continued

SITES IN WYOMING

Site	Other name of site	Agency
48PL11		SIMRBS.
WYO.U:11:1		UD.
WYO.AA:6:1		UD.

SITES IN SOUTH DAKOTA

Site	Other name of site	Agency
39FA45		SIMRBS.
39FA83		SIMRBS.

SITE IN KANSAS

Site	Other name of site	Agency
14SC1	Scott County Pueblo Site	UK SI UNLA.

BIBLIOGRAPHY

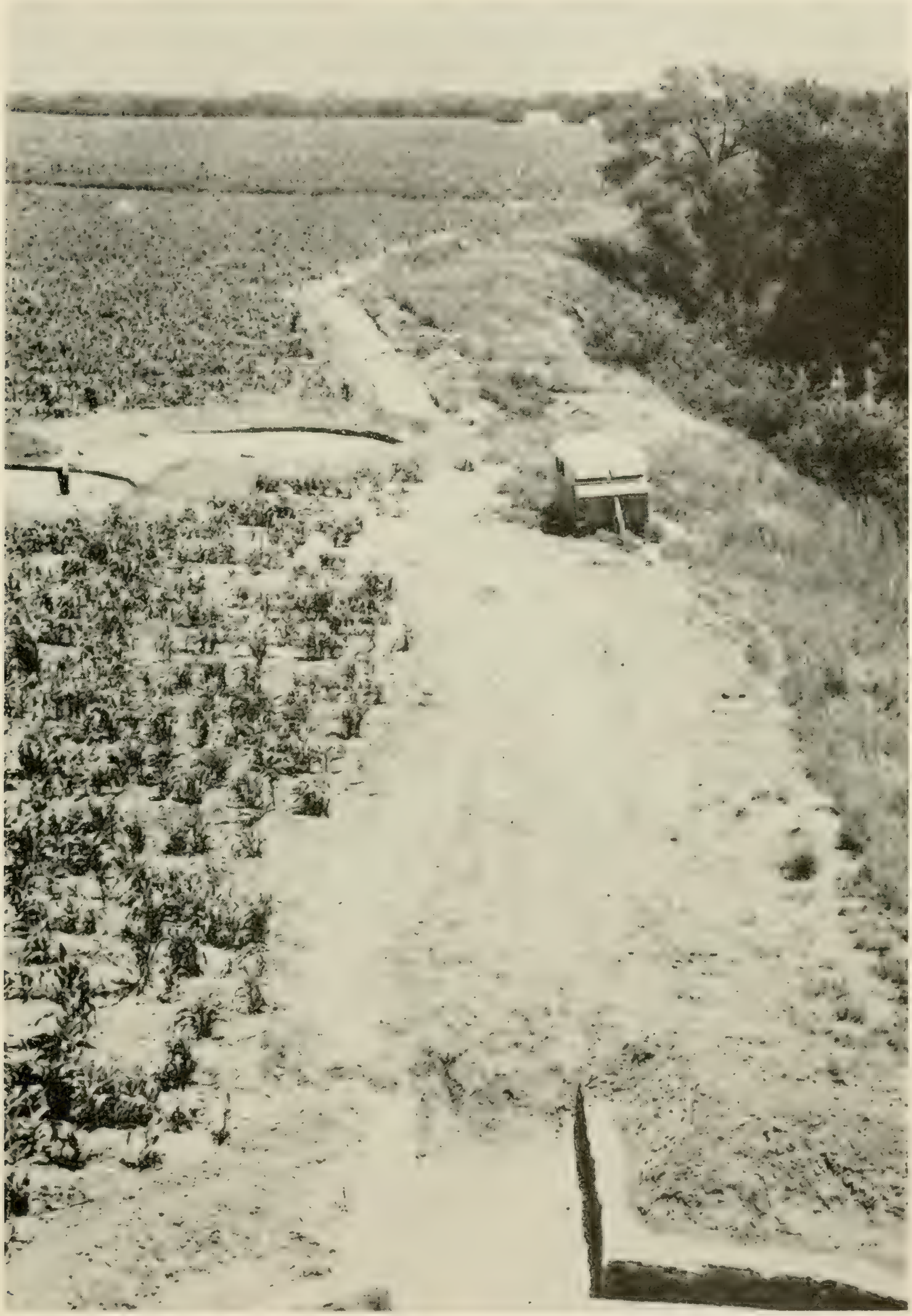
Champe, John L.
1946. Ash Hollow Cave. Univ. Nebraska Stud., n. s., No. 1. Lincoln.
1949. White Cat Village. Amer. Antiq., vol. 14, No. 4, pp. 285–292.
Fletcher, Alice C., and LaFlesche, Francis.
1911. The Omaha tribe. 27th Ann. Rep., Bur. Amer. Ethnol.
Gunnerson, Dolores A.
1956. The Southern Athabascans: Their arrival in the Southwest. El Palacio, vol. 63, pp. 346–365.
Gunnerson, James H.
1956. Plains-Promontory relationships. Amer. Antiq., vol.22, pp. 69–72.
Gunnerson, James H., and Gunnerson, Dolores A.
MS. Further notes on the Dismal River Aspect. Paper presented at Seventh Plains Archeological Conference, Lincoln, Nebr., November 1949.
Hill, A. T., and Metcalf, George.
1942. A site of the Dismal River Aspect in Chase County, Nebraska. Nebraska Hist. Mag., vol. 22, No. 2, pp. 158–226.
Huscher, Betty H., and Huscher, Harold A.
1943. The hogan builders of Colorado. Southwestern Lore, vol. 9, No. 2. Gunnison, Colo.
Jeancon, J. A.
1929. Archeological investigations in the Taos Valley, New Mexico, during 1920. Smithsonian Misc. Coll., vol. 81, No. 12.
Keur, Dorothy L.
1941. Big Bead Mesa. Soc. Amer. Archeol., Mem. No. 1.
Kidder, A. V.
1932. The artifacts of Pecos. Pap. Southwestern Expedition, No. 6, Robert S. Peabody Found. for Archeol., Phillips Academy, Andover, Mass.
Kivett, Marvin F.
MS. Field notes. (1946.) MS. on file at River Basin Surveys headquarters, Lincoln, Nebr.
MS. Field notes. (1949.) MS. on file at Nebraska State Historical Society, Lincoln, Nebr.
Martin, H. T.
1909. Further notes on the Pueblo ruins of Scott County. Kansas Univ. Sci. Bull., vol. 5, No. 2.
Martin, Paul S., Quimby, George I., and Collier, Donald.
1947. Indians before Columbus. Chicago.
Metcalf, George.
1949. Three pottery types from the Dismal River Aspect. Proc. Fifth Plains Conf. for Archeol. Univ. Nebraska, Lab. Anthrop., Note Book No. 1, pp. 73–78. Lincoln.

MINDELEFF, COSMOS.
1898. Navaho houses. 17th Ann. Rep., Bur. Amer. Ethnol., pt. 2, pp. 469–517.
MORAN, W. J., COVELL, R., ABASHKIN, B. J.
1930. Soil survey of Harlan County, Nebraska. U. S. Dept. Agr., Bur. Chemistry and Soils [Soil Survey Rep.], ser. 1930, No. 12.
RENAUD, E. B.
1931. Archeological survey of eastern Colorado. Denver.
1932. Archeological survey of eastern Colorado, 2d Rep. Denver.
1933. Archeological survey of eastern Colorado, 3d Rep. Denver.
1935. The archeological survey of Colorado, 4th Rep., seasons 1933 and 1934. Univ. Denver, Dept. Anthrop., The Archeological Survey of the High Western Plains, 6th Rep. Denver.
1937. Northeastern New Mexico. Univ. Denver, Dept. Anthrop., The Archeological Survey of the High Western Plains, 9th Rep. Denver.
1942. Reconnaissance work in the upper Rio Grande Valley, Colorado and New Mexico. Univ. Denver, Dept. Anthrop., Archeol. Ser., 3d Pap., Denver.
1946. Archeology of the upper Rio Grande Basin in southern Colorado and northern New Mexico. Univ. Denver, Dept. Anthrop., Archeol. Ser., 6th Pap. Denver.
RICE, T. D., and PARTY.
1914. Reconnaissance survey of western Nebraska. U. S. Dept. Agr. Field Operations of the Bureau of Soils, 1911. Pp. 1875–1889.
SECOY, FRANK R.
1951. The identity of the "Padouca"; an ethnohistorical analysis. Amer. Anthrop., vol. 53, No. 4, pt. 1, pp. 525–542.
SMITH, CARLYLE S.
1949. Archeological investigations in Ellsworth and Rice Counties, Kansas. Amer. Antiq., vol. 14, pt. 1, pp. 292–300.
STEPHENSON, ROBERT L.
1954. Taxonomy and chronology in the Central Plains-Middle Missouri River area. Plains Anthrop., pp. 15–22.
STEWARD, JULLIAN H.
1937. Ancient caves of the Great Salt Lake region. Bur. Amer. Ethnol. Bull. 116.
STRONG, W. D.
1932. An archeological reconnaissance in the Missouri Valley. Explorations and Field-work of the Smithsonian Institution in 1931, pp. 151–158.
1935. An introduction to Nebraska Archeology. Smithsonian Misc. Coll., vol. 93, No. 10.
THOMAS, ALFRED B.
1935. After Coronado, Spanish exploration northeast of New Mexico, 1696–1727. Documents from the Archives of Spain, Mexico and New Mexico. Norman, Okla.
1940. The Plains Indians and New Mexico, 1751–1778. Albuquerque, N. Mex.
WEAKLY, HARRY E.
1946. A preliminary report on the Ash Hollow charcoal. *In* Champe, 1946, pp. 105–110.

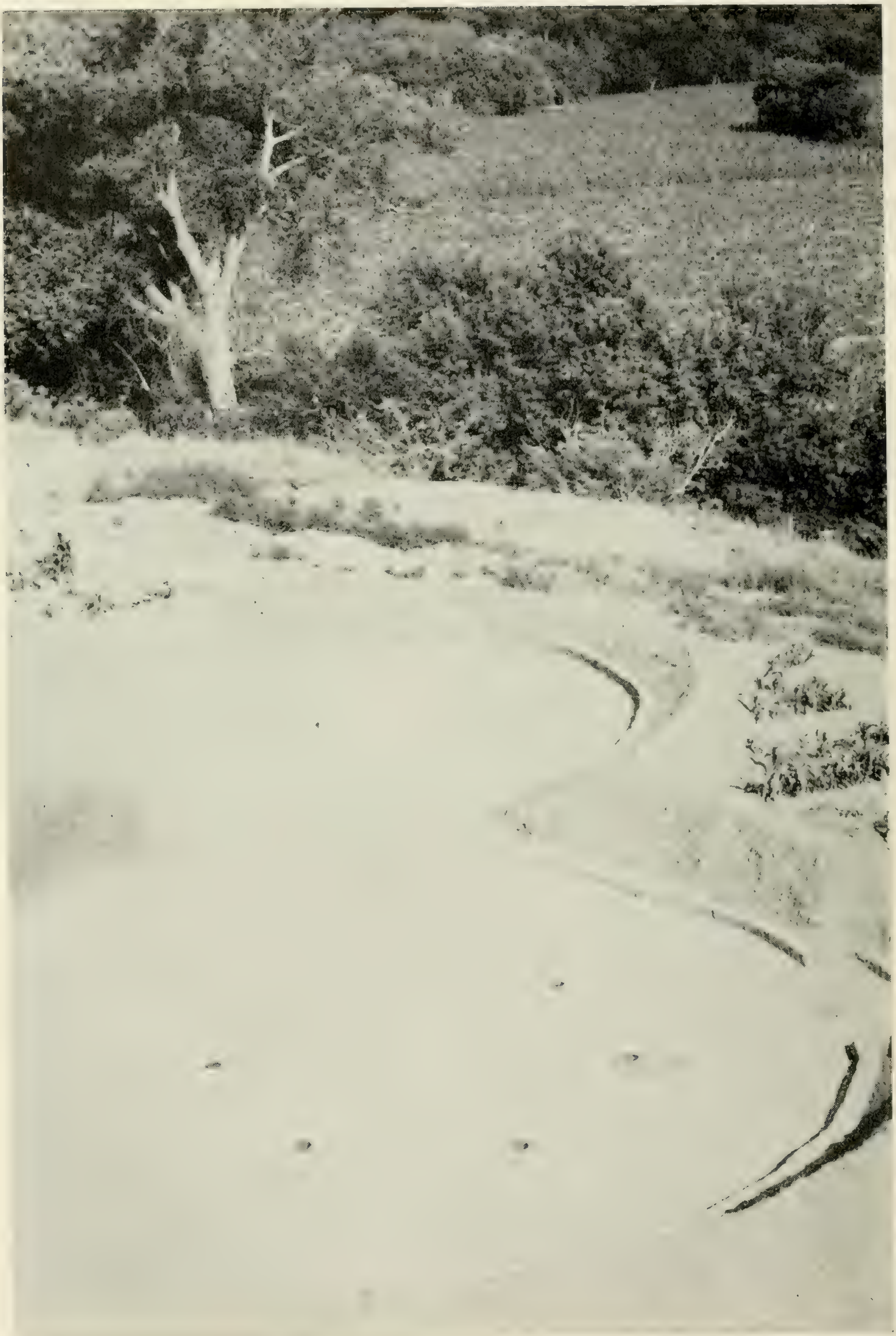
Wedel, Waldo R.
1935. Contributions to the archeology of the Upper Republican Valley. Nebraska Hist. Mag., vol. 15, No. 3, pp. 133–209.
1938. The direct-historical approach in Pawnee archeology. Smithsonian Misc. Coll., vol. 97, No. 7.
1940 a. Archeological explorations in western Kansas. Explorations and Field-work of the Smithsonian Institution in 1939, pp. 83–86.
1940 b. Culture sequences in the central Great Plains. Smithsonian Misc. Coll., vol. 100, pp. 291–352.
1941. Environment and native subsistence economies in the central Great Plains. Smithsonian Misc. Coll., vol. 101, No. 3, pp. 1–29.
1942. Archeological remains in central Kansas and their possible bearing on the location of Quivera. Smithsonian Misc. Coll., vol. 101, No. 7.
1947. Culture chronology in the central Great Plains. Amer. Antiq., vol. 12, No. 3, pt. 1, pp. 148–156.
1949 a. Some Central Plains sherd types from Kansas. Proc. Fifth Plains Conf. for Archeol. Univ. Nebraska, Lab. Anthrop., Note Book No. 1, pp. 86–90. Lincoln.
1949 b. Some provisional correlations in Missouri Basin archeology. Amer. Antiq., vol. 14, pp. 328–339.
1953. Some aspects of human ecology in the Central Plains. Amer. Anthrop., vol. 55, pp. 499–514.

Williston, S. W., and Martin, H. T.
1899. Some Pueblo ruins in Scott County, Kansas. Kansas Hist. Coll., vol. 6.

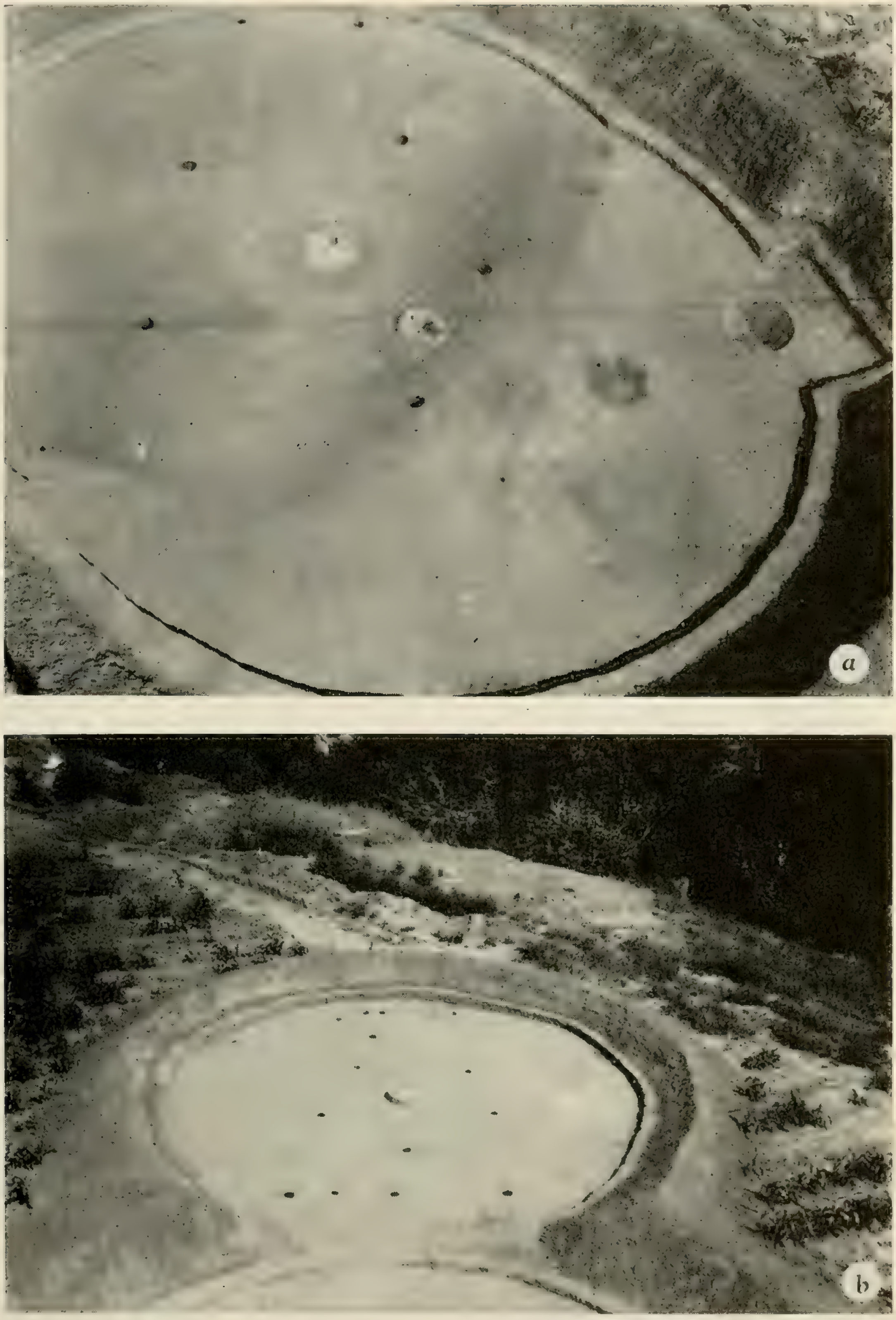
Woodward, Arthur.
1946. The metal tomahawk. Bull. Fort Ticonderoga Mus., vol. 7, No. 3, pp. 2–42.



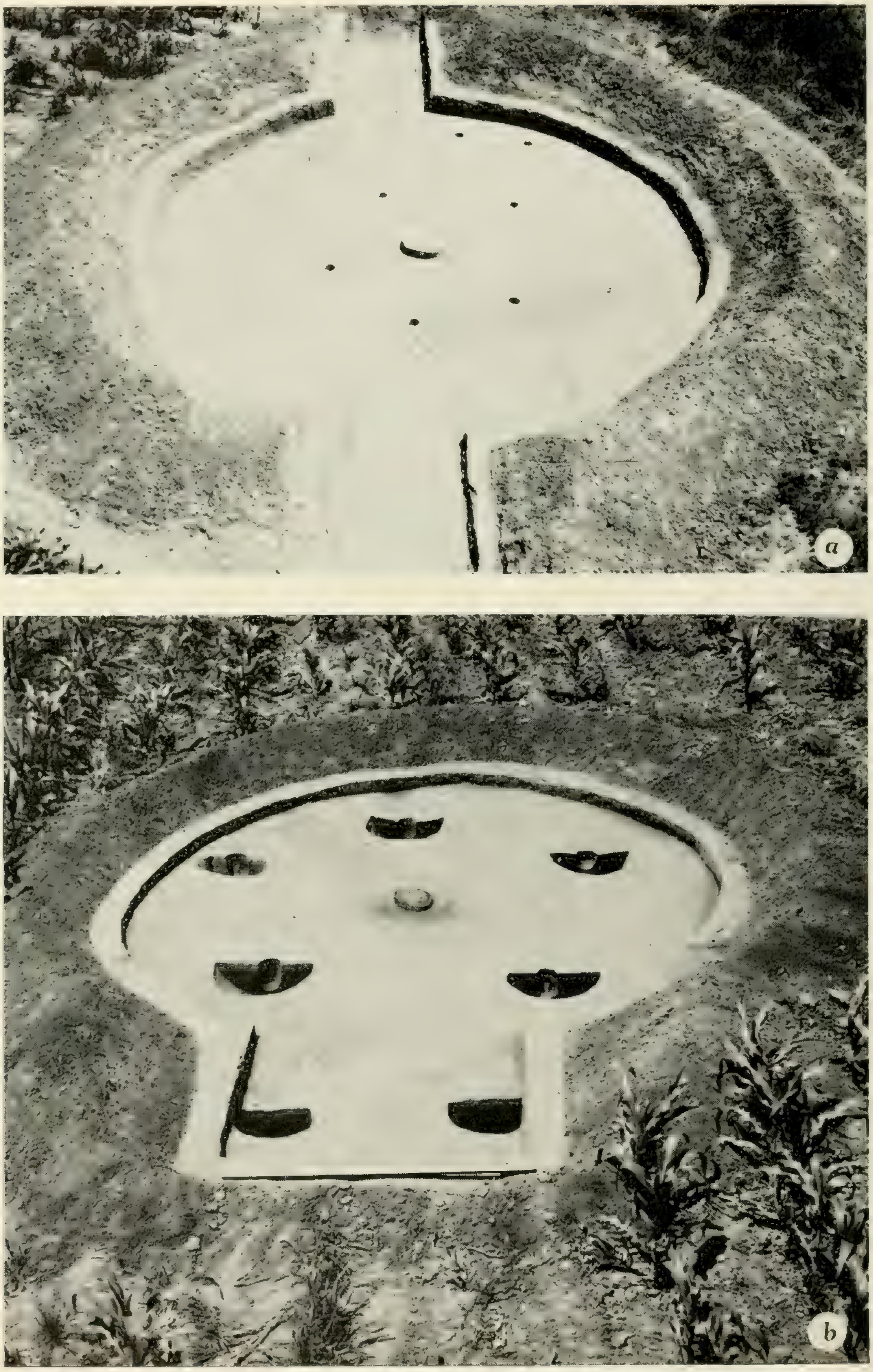
View looking east across 25HN37. House IV is in the immediate foreground. Houses I, II, and III are in the middle of the picture. Houses V and VI were located just beyond the fence near the top of the picture. The trees at the right of the picture are along Prairie Dog Creek.



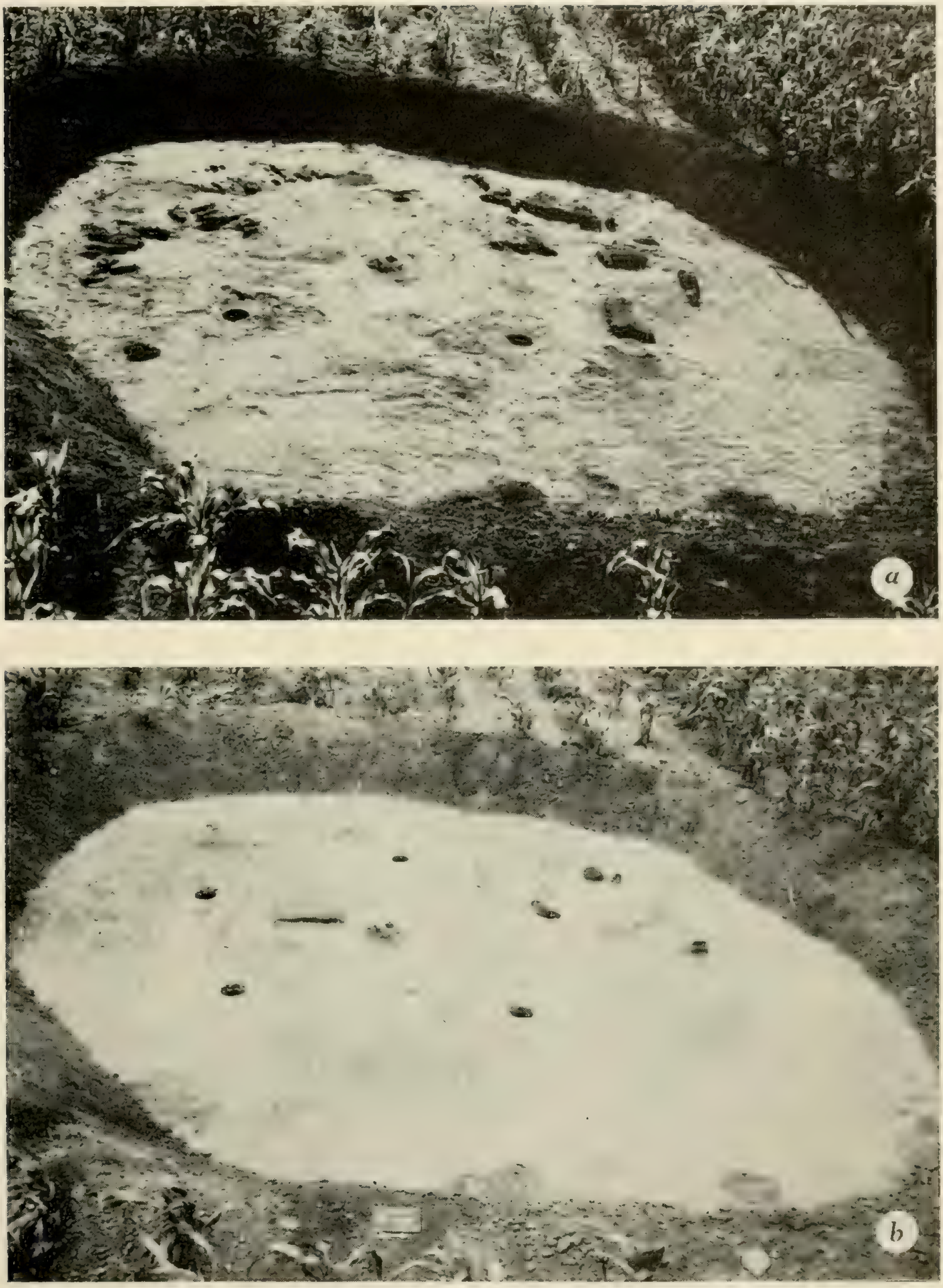
View across excavations for Houses I, II, and III, 25HN37. The five postholes in the foreground represent House II. The sixth posthole was later found near the fireplace of House I.



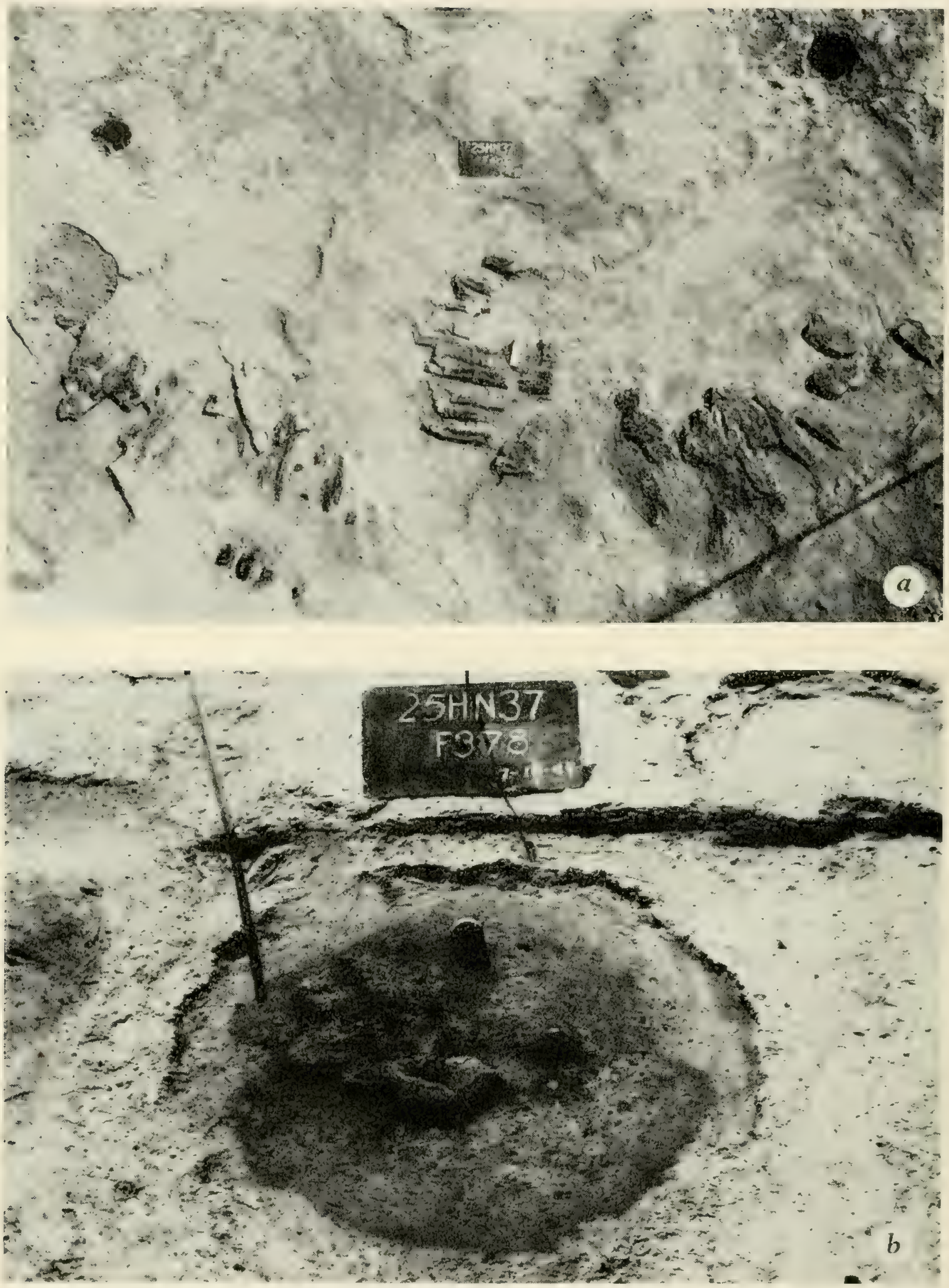
a, House I, 25HN37, with postholes reopened. Steel chaining pins indicate locations of other postholes in the excavation. *b*, House III, 25HN37, with postholes reopened. The extra postholes in the excavation are also evident.



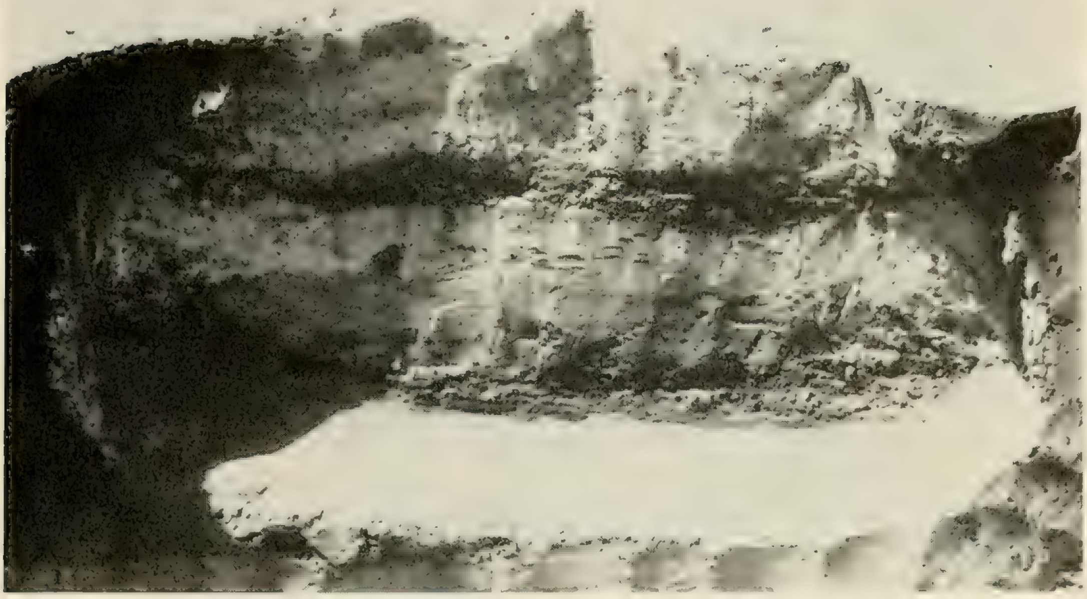
a, House IV, 25HN37, with postholes reopened. *b*, House V, 25HN37, with postholes cross sectioned.



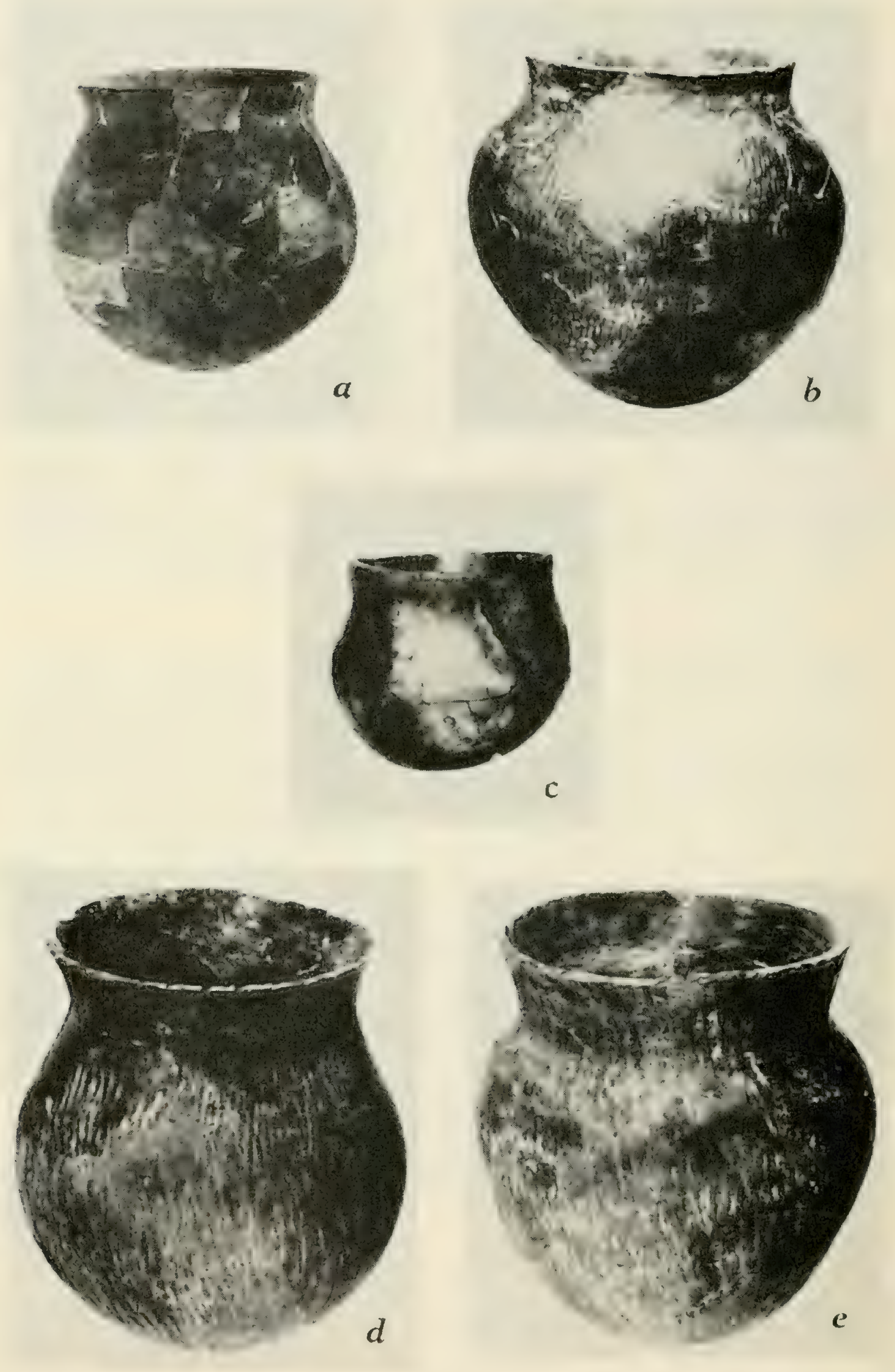
a, House VI, 25HN37, with charred poles left on floor. *b*, House VI, 25HN37, after charred poles were removed.



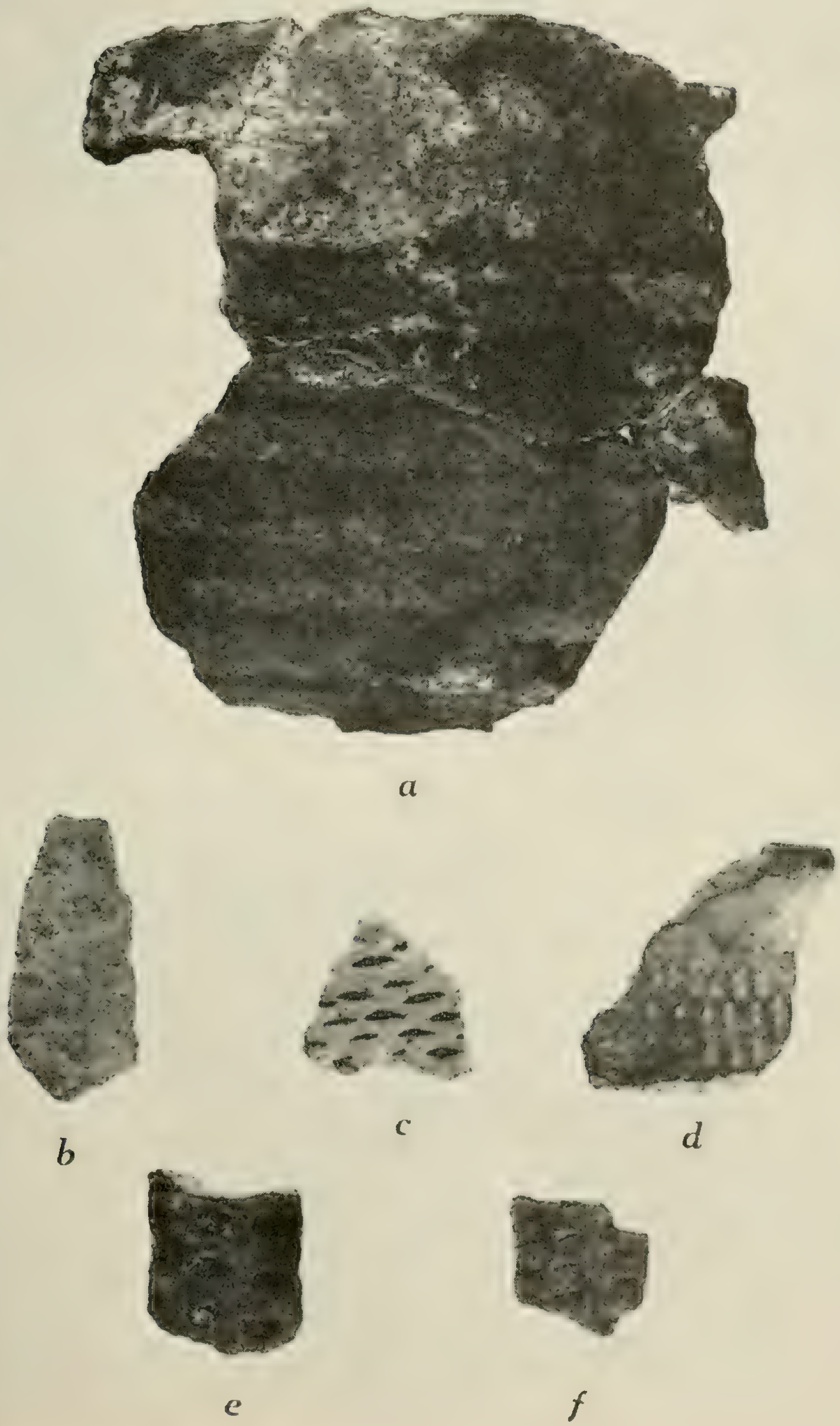
a Charred poles on floor of House VI, 25HN37. The arrow points north. *b*, Iron ax embedded in fireplace of House VI, 25HN37.



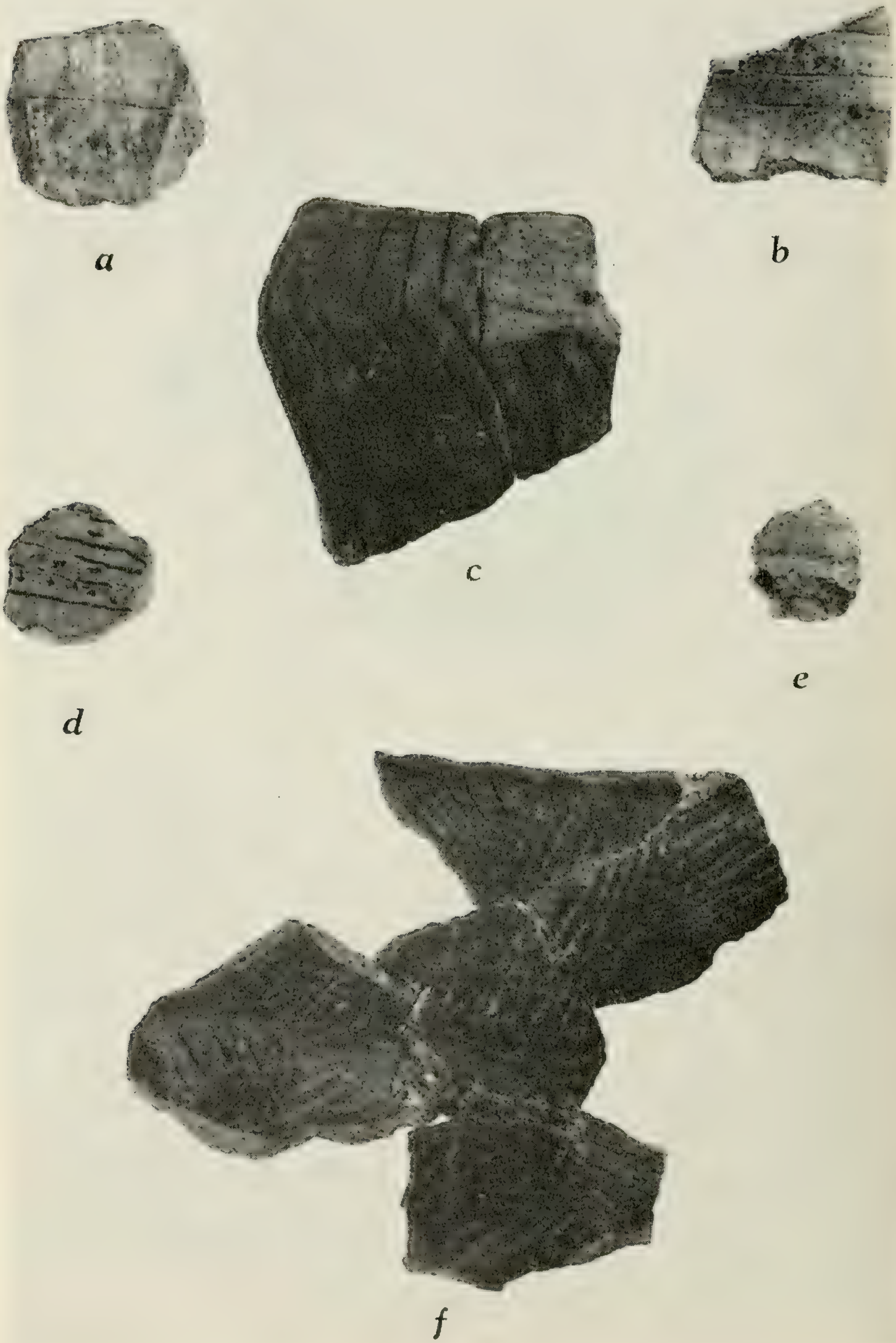
Cross-sectioned roasting pit at 25HN37.



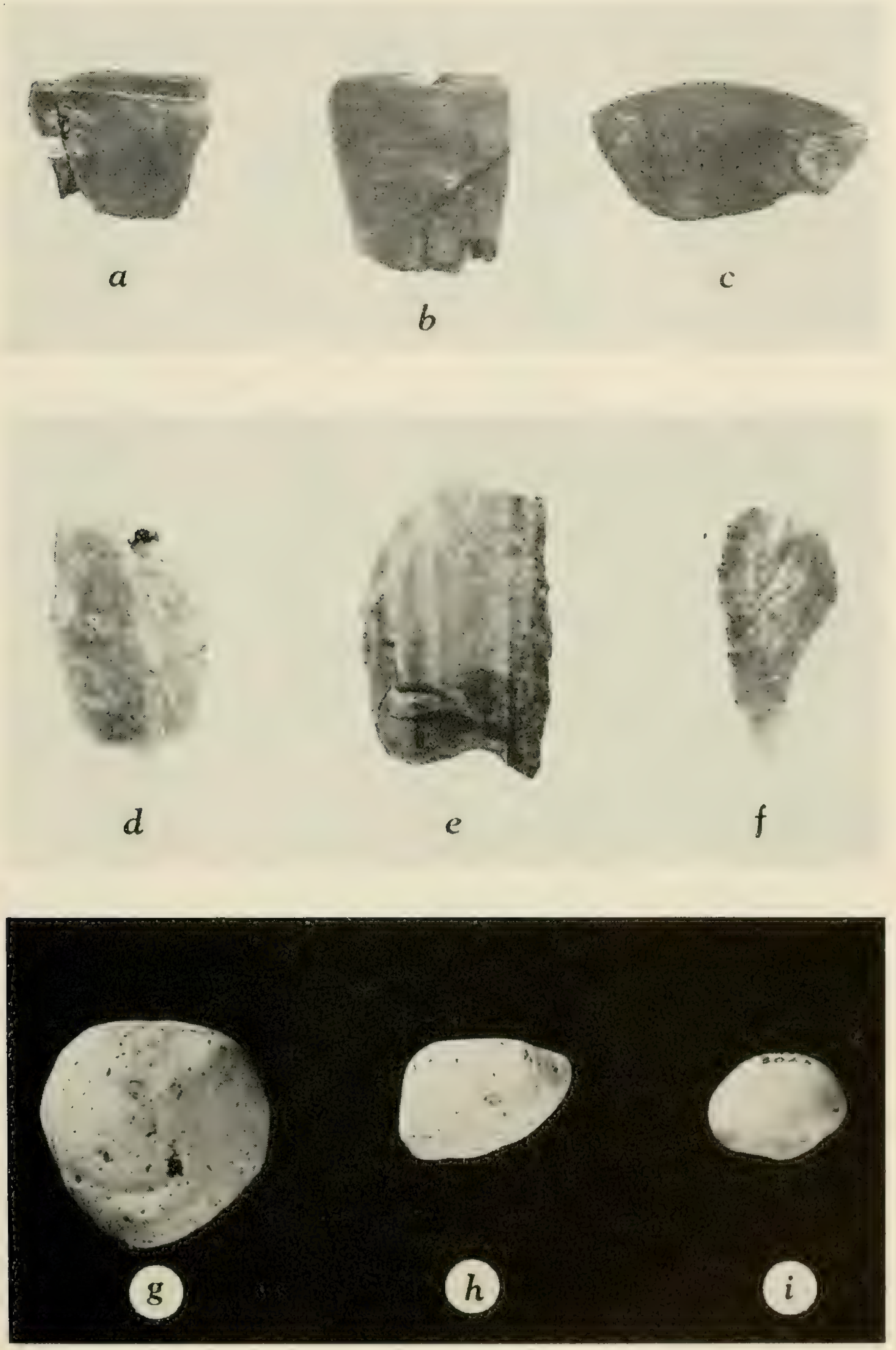
Restored pottery vessels from 25CH1. *a*, Height, 9 inches. *b*, Height, 10 inches. *c*, Height 4⅛ inches. *d*, Height, 7½ inches. *e*, Height, 8⅛ inches. (*a*, University of Nebraska Laboratory of Anthropology Collection; *b–e*, Nebraska State Historical Society Collection.)



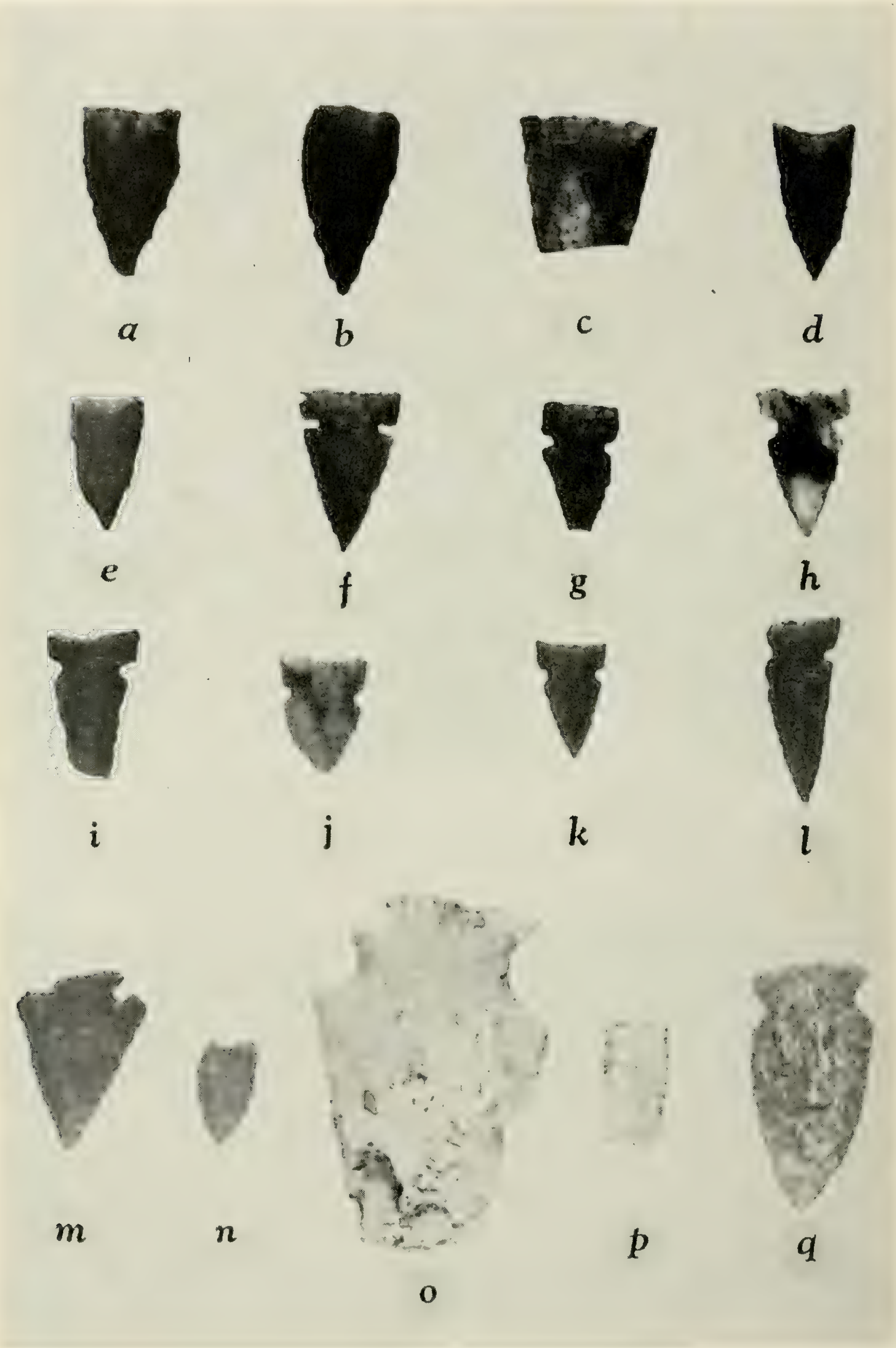
Unusual Dismal River pottery. *a*, Coiled pottery from 25CH1. *b*, From 25C27. *c*, *d*, Show surface decorated with punctates; *c*, from 25N3; *d*, from COLO:S:12:5. *e*, *f*, From 25SX301. (*b* is 3.7 cm. long.)



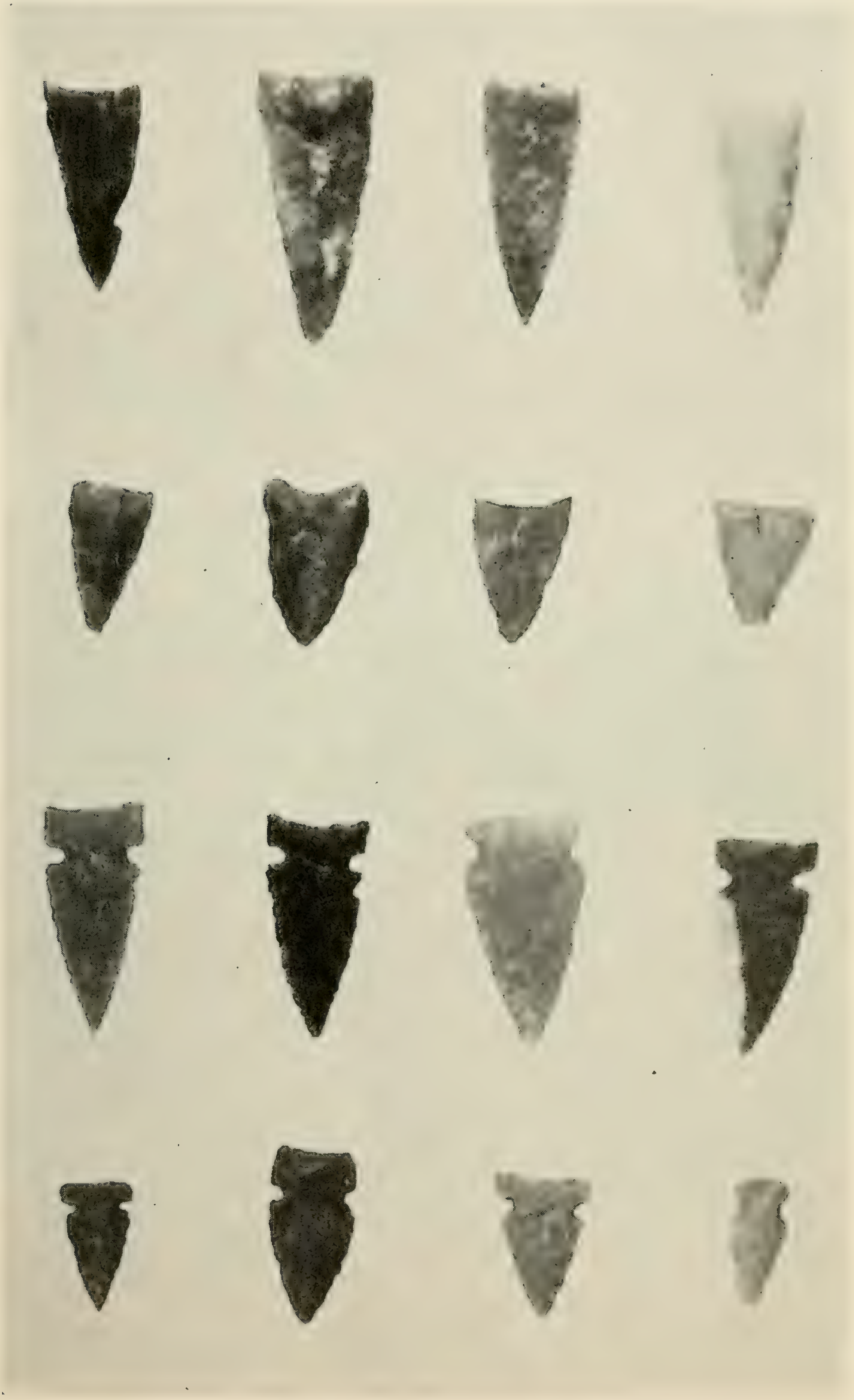
Decorated Dismal River pottery. Incised decoration on sherds *a–d* and *f*. *e*, Has a cord-impressed line. *a*, *c*, From 25HO21. *b*, *e*, From 25DN1. *d*, From 25HO7. *f*, From 25LN2. (*b* is 2.6 cm. long.)



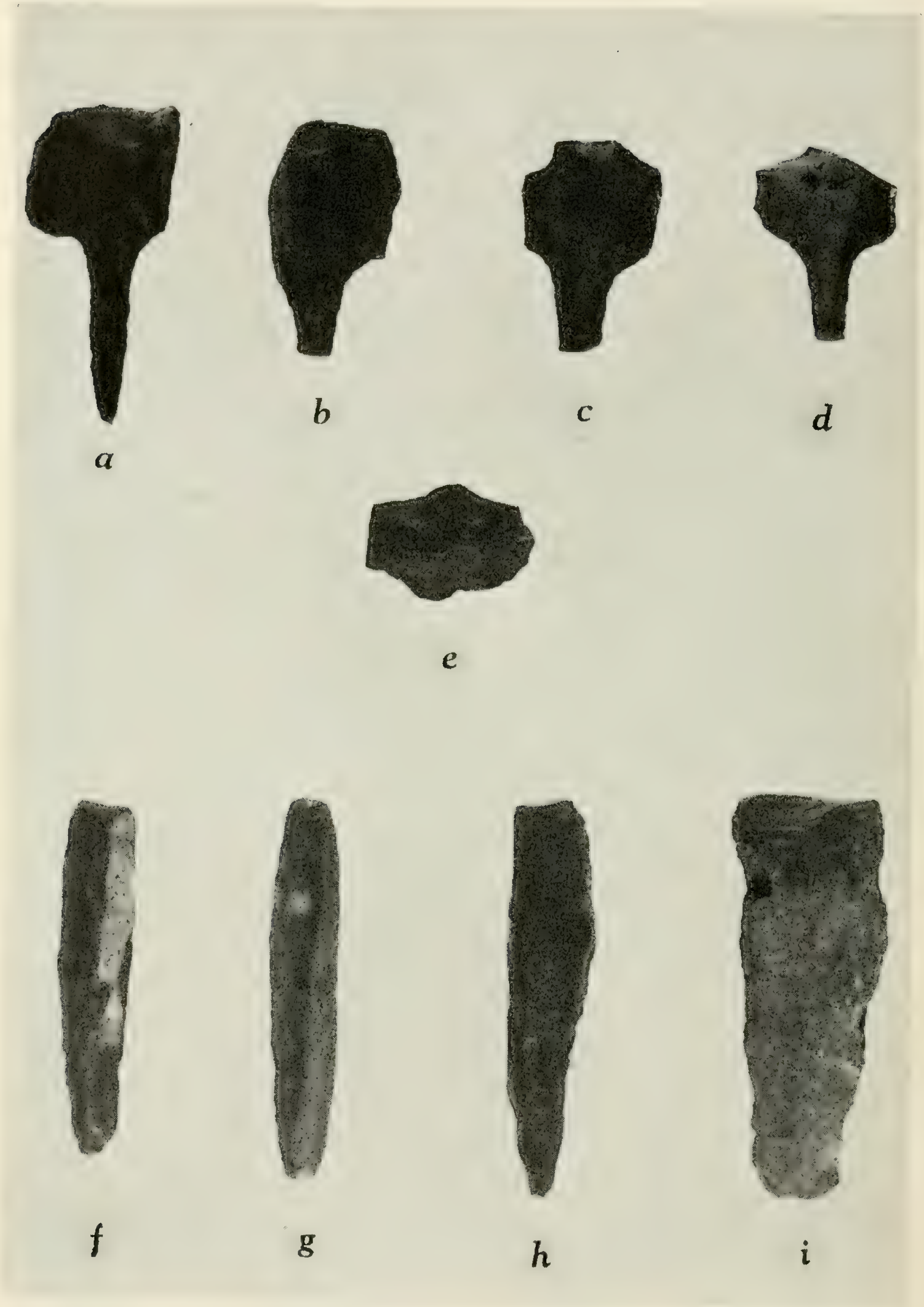
a–c, Pottery pipe fragments from 25HO21. *d–f*, Gravers from 25HN37. *g–i*, Smooth pieces of caliche from 25HN37. (*b* 3.1 cm. long; *f*, 3.3 cm. long; *g*, 3.4 cm. long.)


a
b
c
d
e
f
g
h
i
j
k
l
m
n
o
p
q

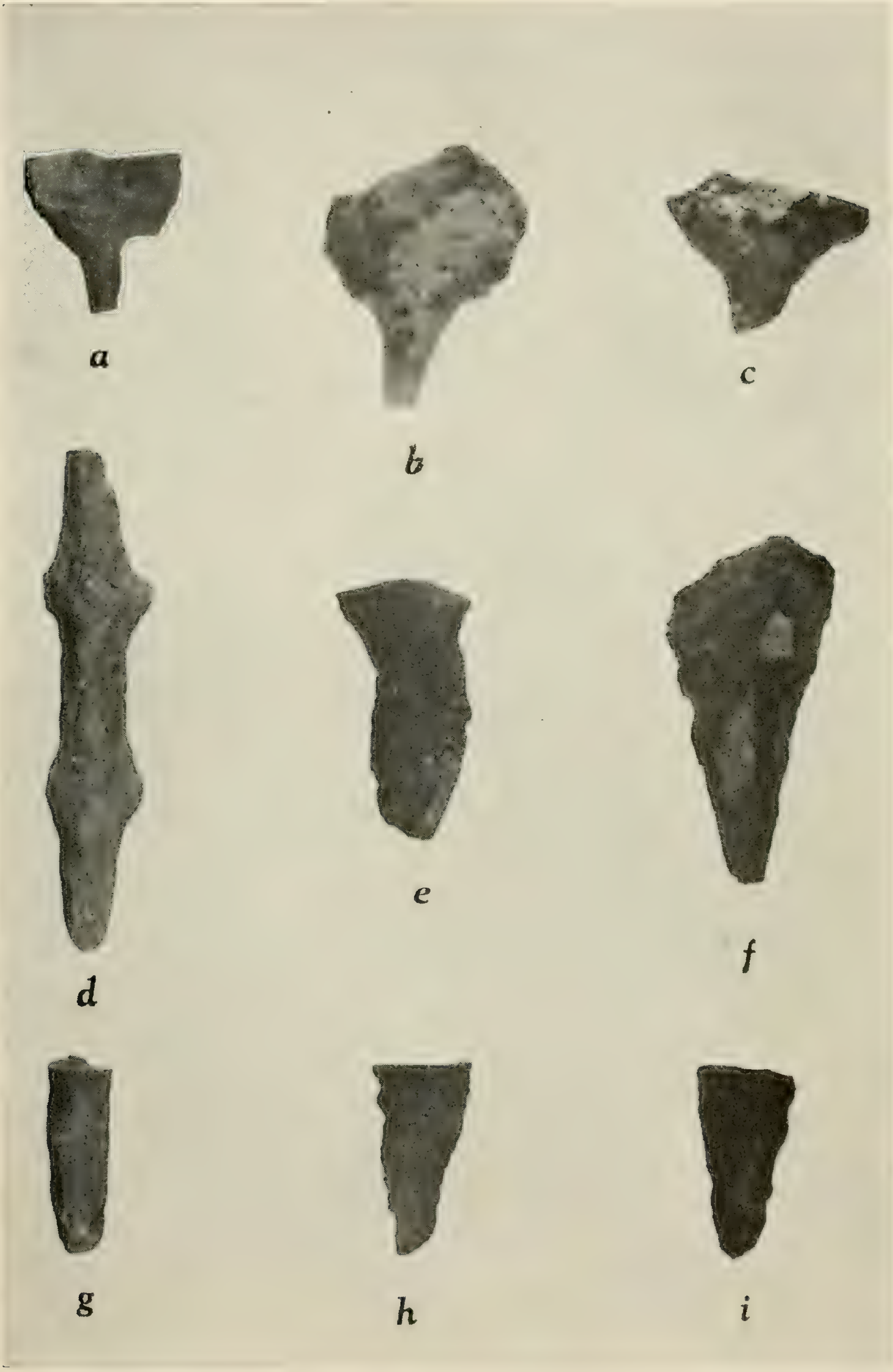
Projectile points from 25HN37. (*a* is 2.4 cm. long.)



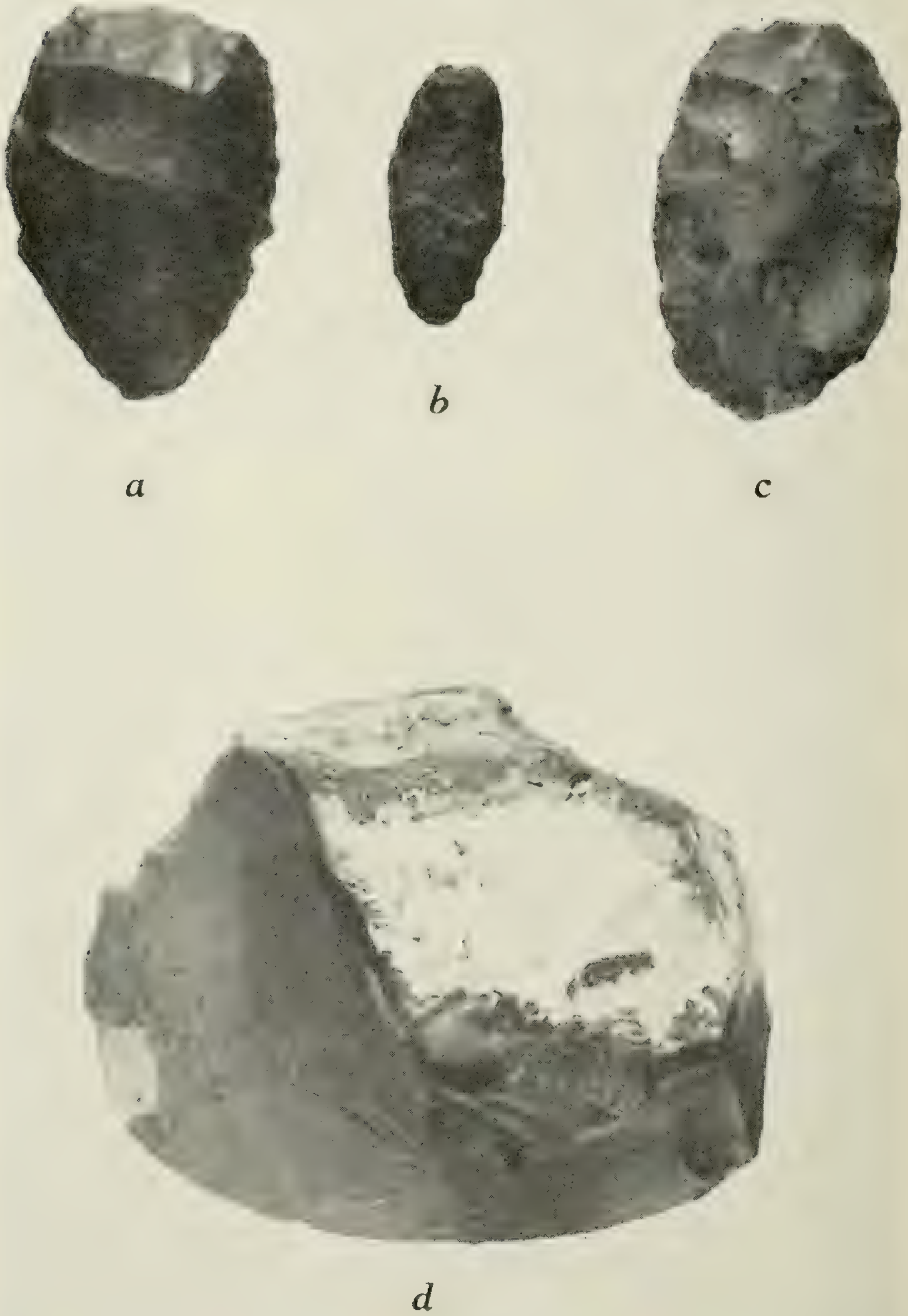
Projectile points from 25HO21. (Upper left is 2.7 cm. long.)



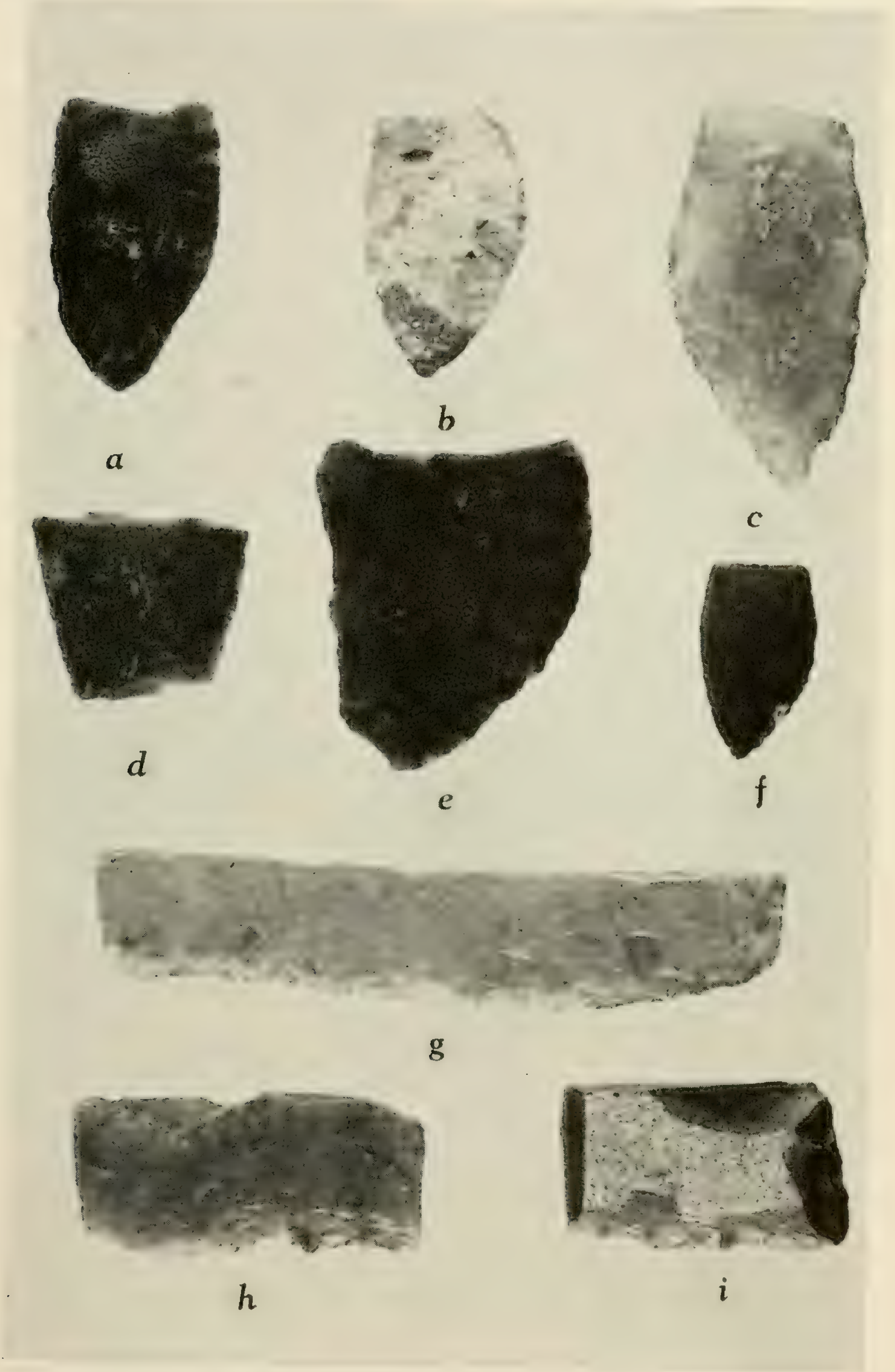
Drills from 25HN37. (*a* is 4.6 cm. long.)



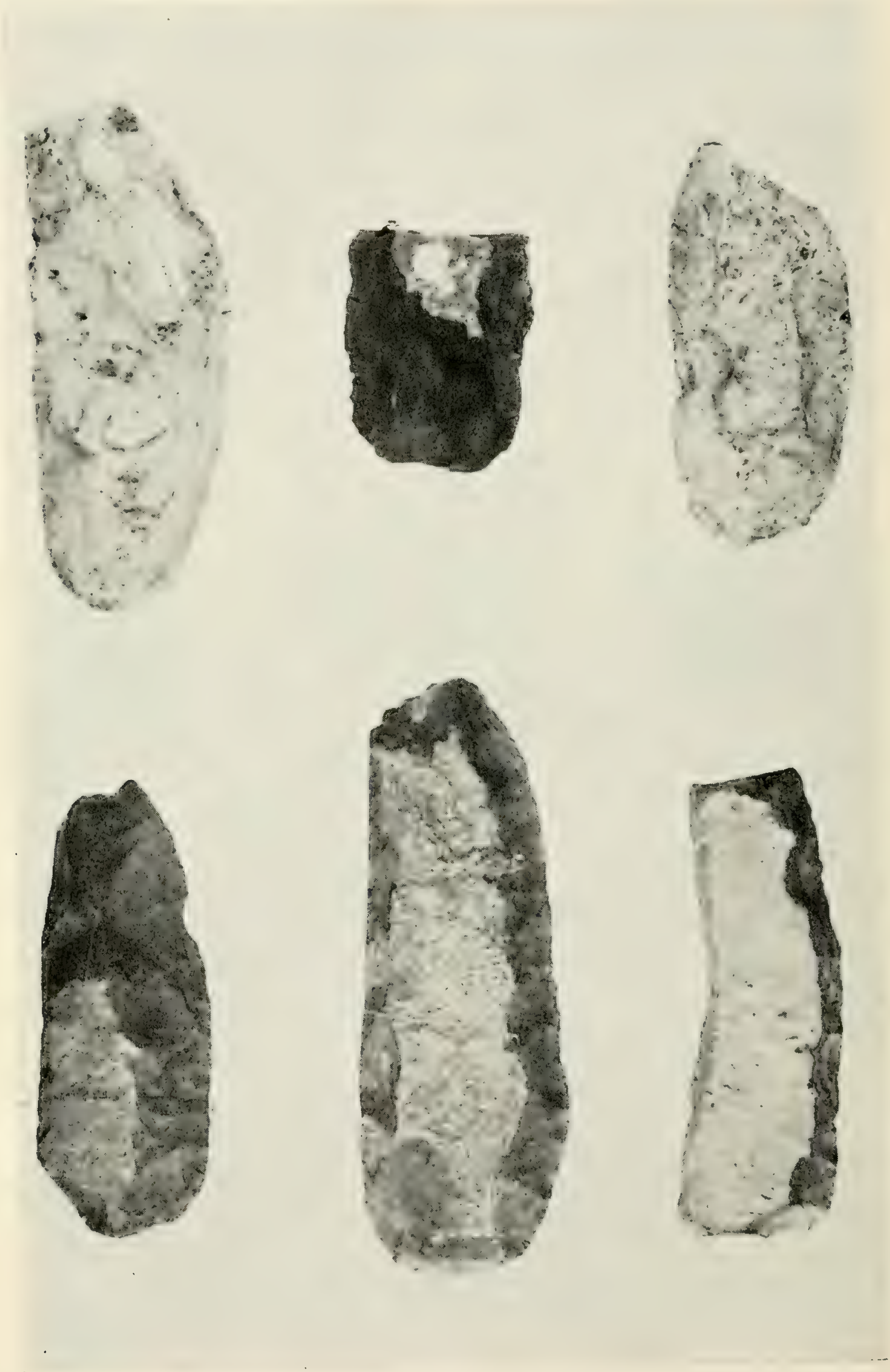
Drills from 25HO21. (Lower left is 2.9 cm. long.)



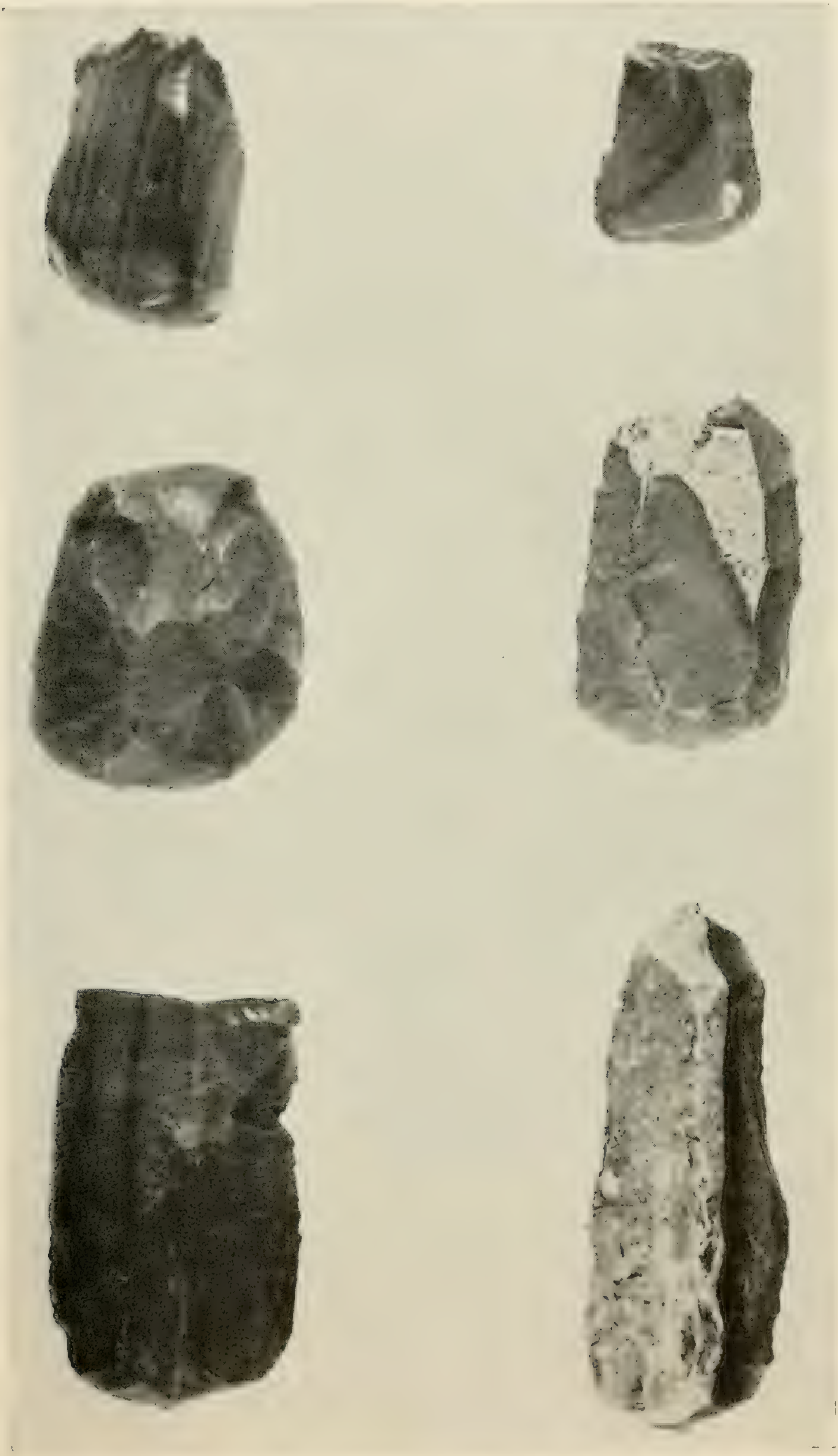
Knives from 25HN37. (*a* is 5.5 cm. long.)



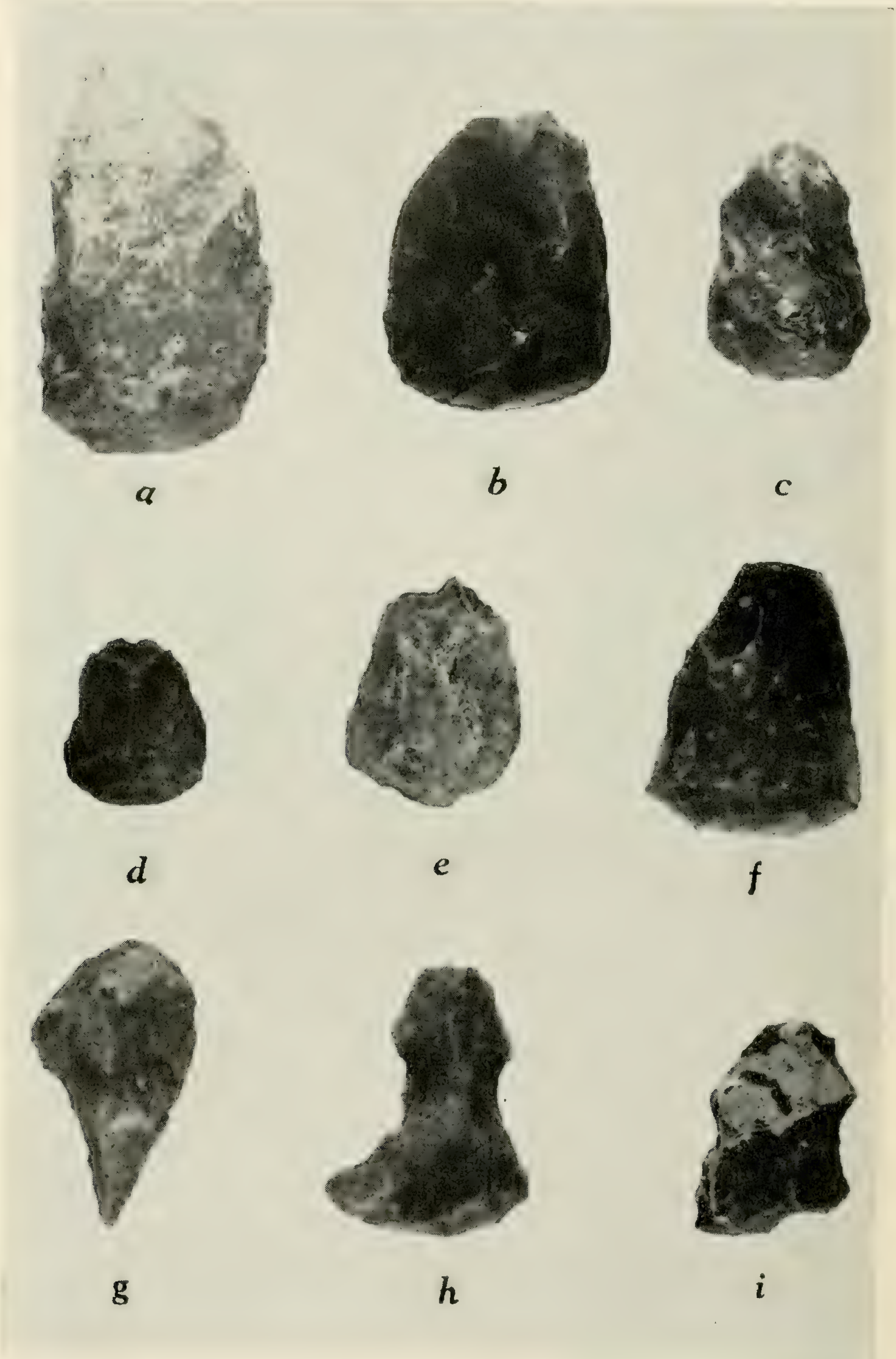
Knives from 25HO21. (*g* is 11 cm. long.)



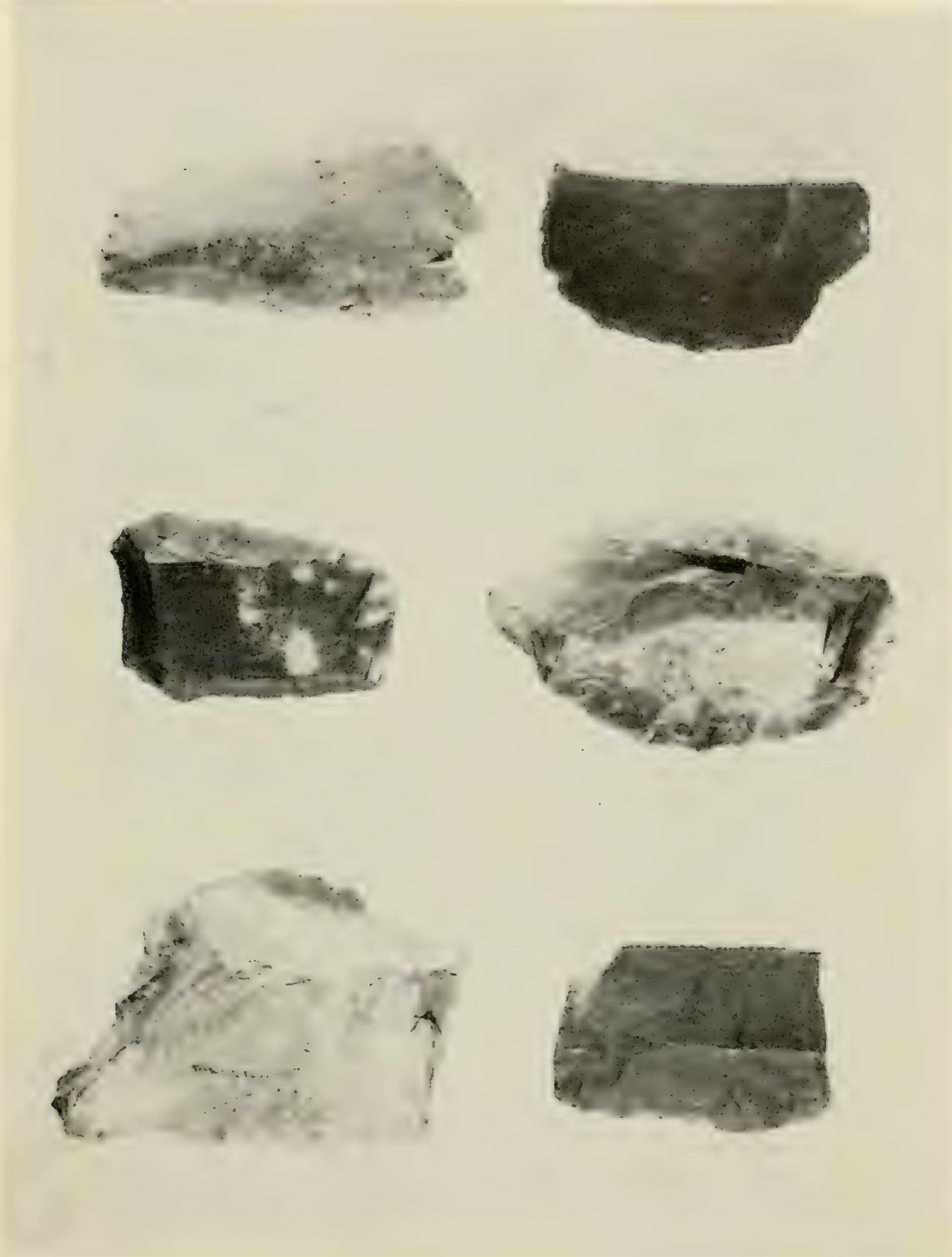
Choppers from 25HN37. (Upper left is 15 cm. long.)



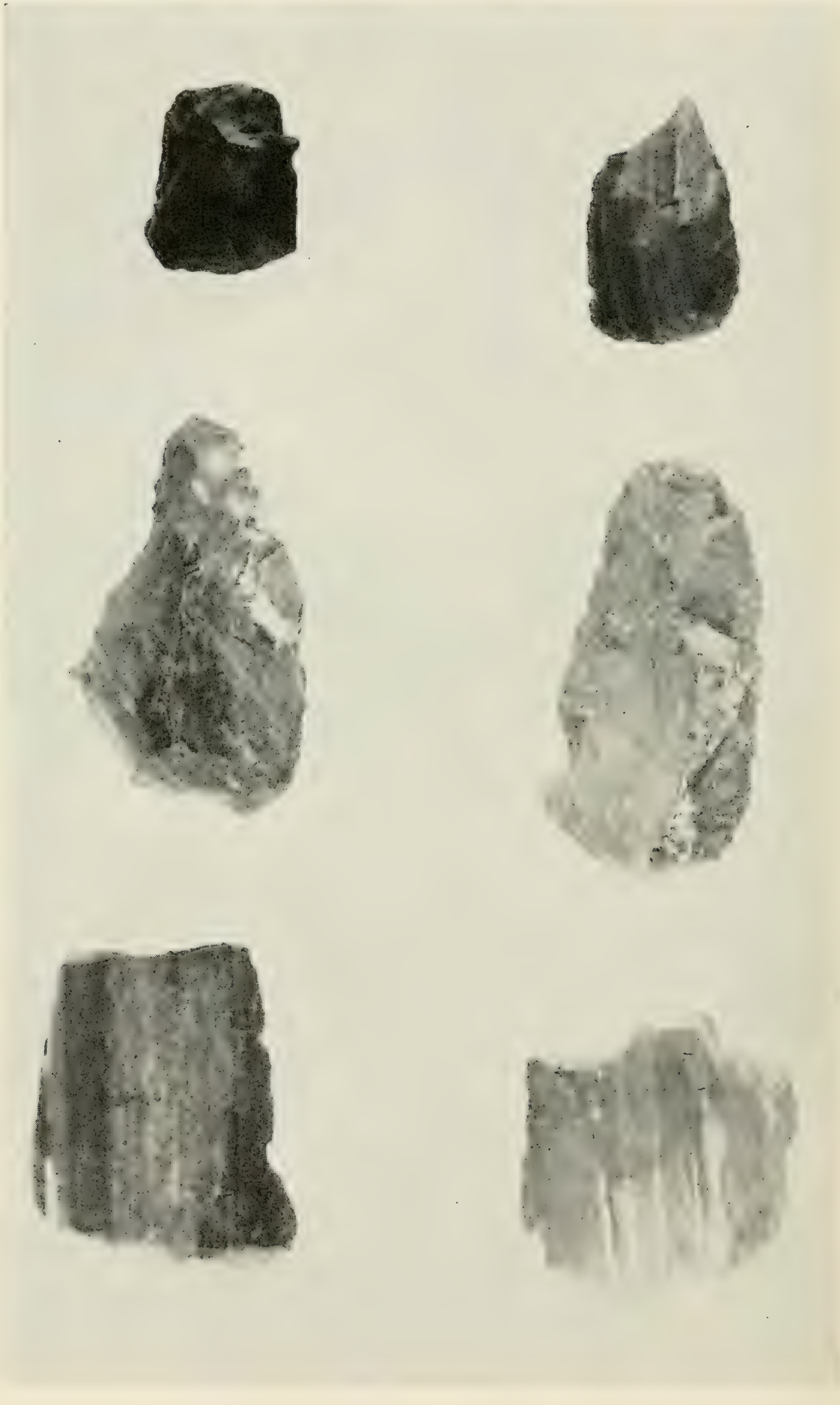
End scrapers from 25HN37. (Upper left is 4 cm. long.)



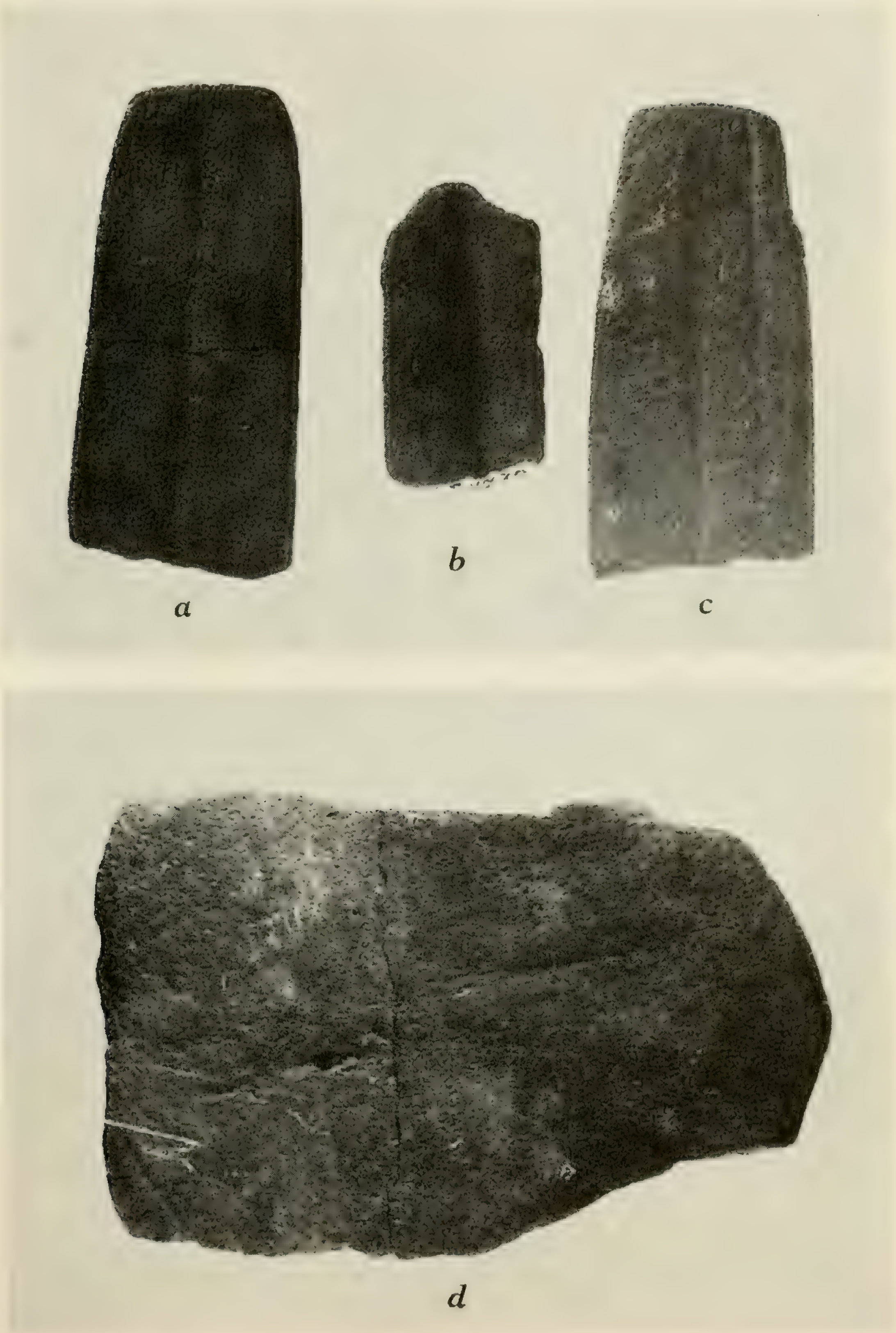
Scrapers with tangs or projections (*a–f* and *h*) and gravers (*g* and *i*) from 25HO21. (*b* is 4.5 cm. long.)



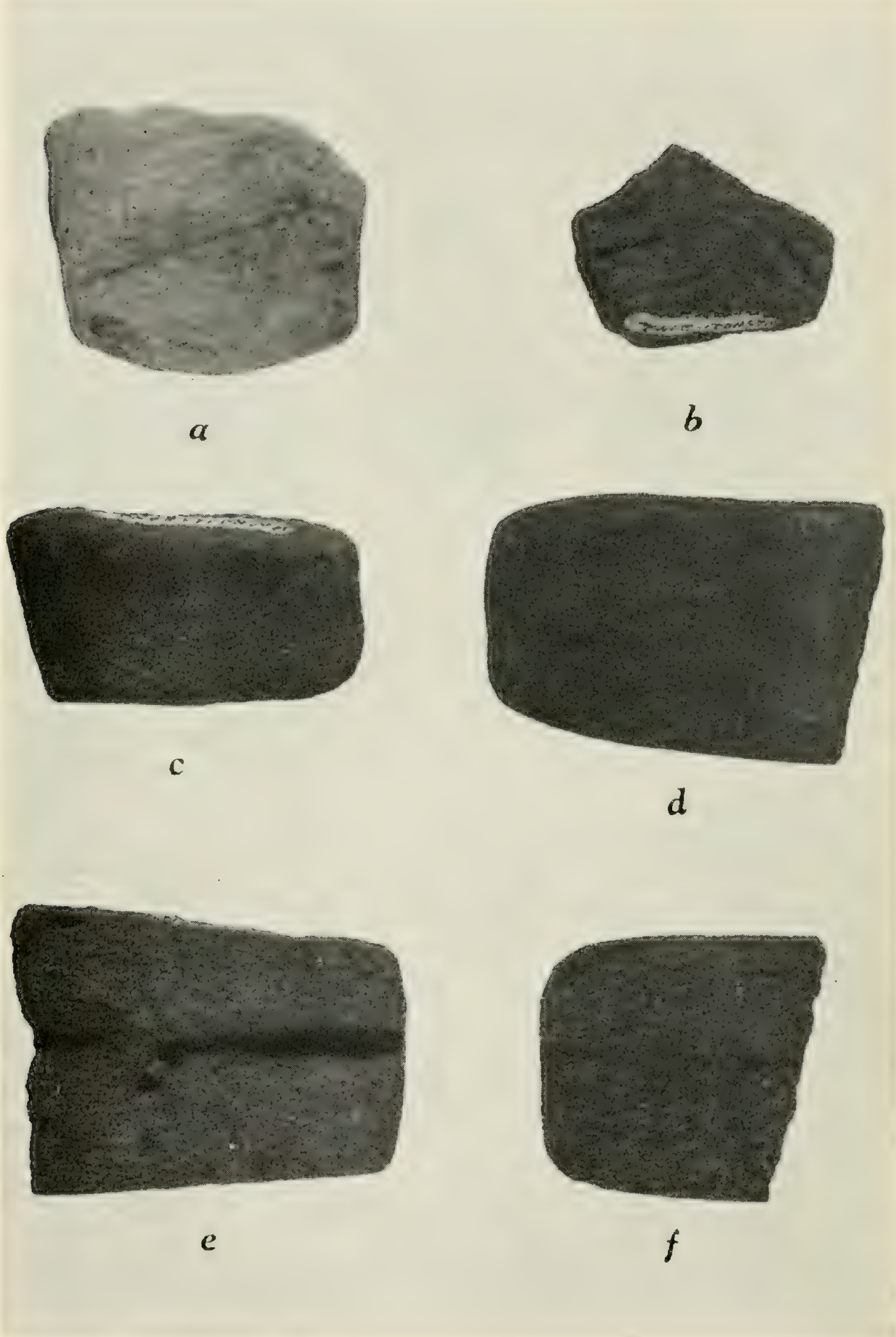
Side scrapers from 25HN37. (Upper right is 5.4 cm. long.)



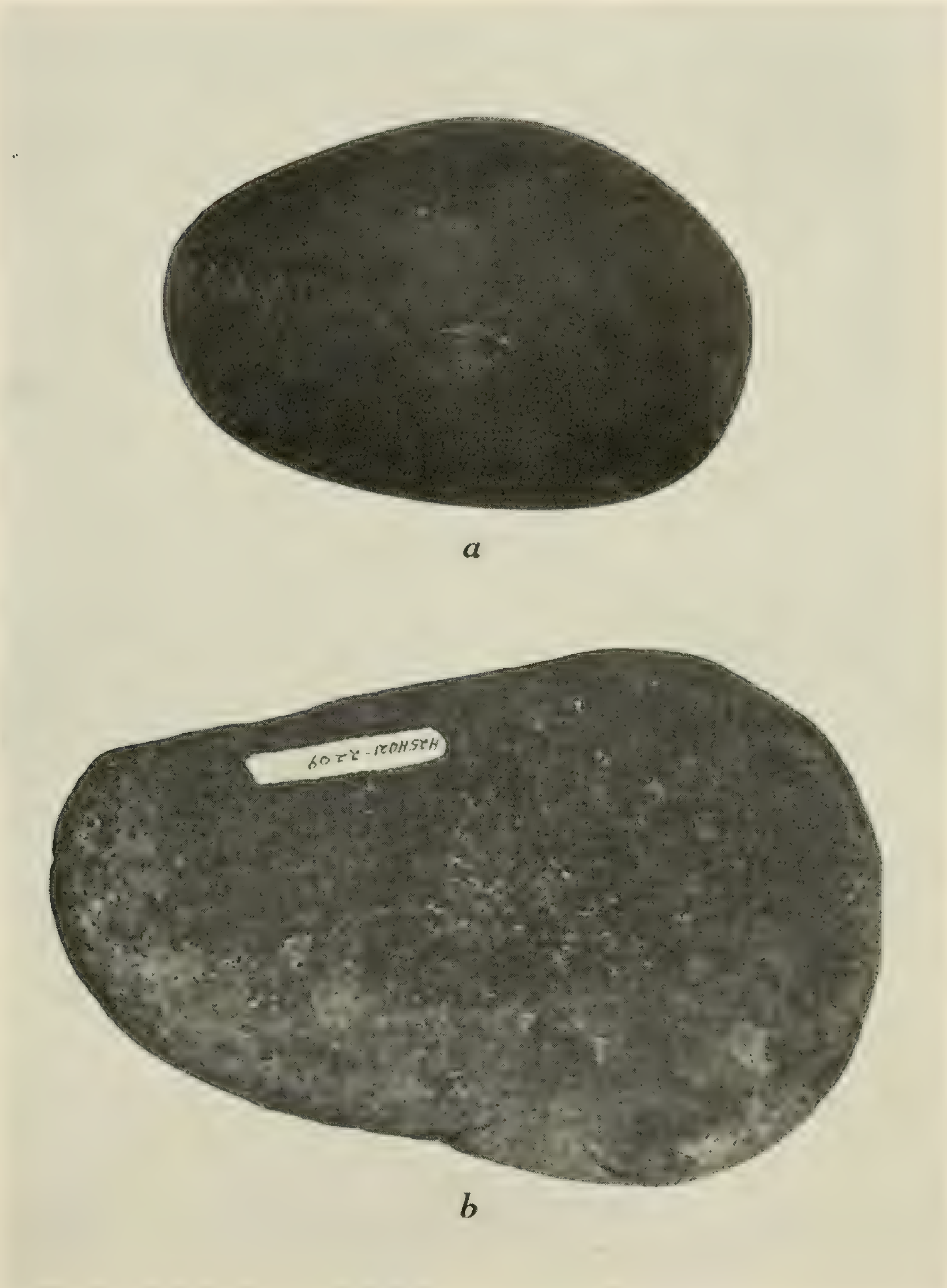
End scrapers with projections or tangs from 25HN37. (Upper left is 2.7 cm. long.)



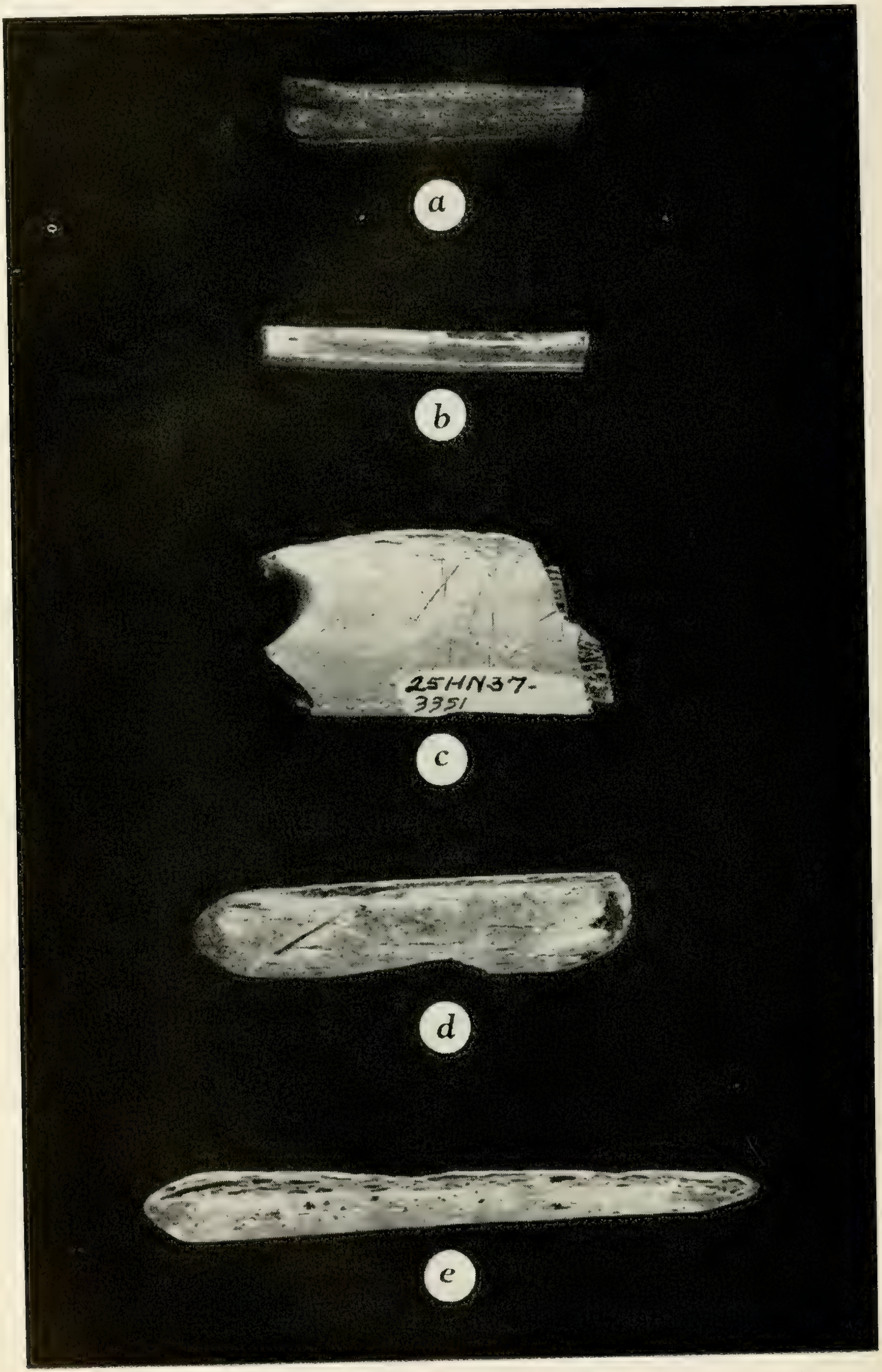
a–c, Sandstone abraders from 25HN37. *d*, Metate from 25HN37. (*c*, 7.7 cm. long; *d*, 20 cm. long.)



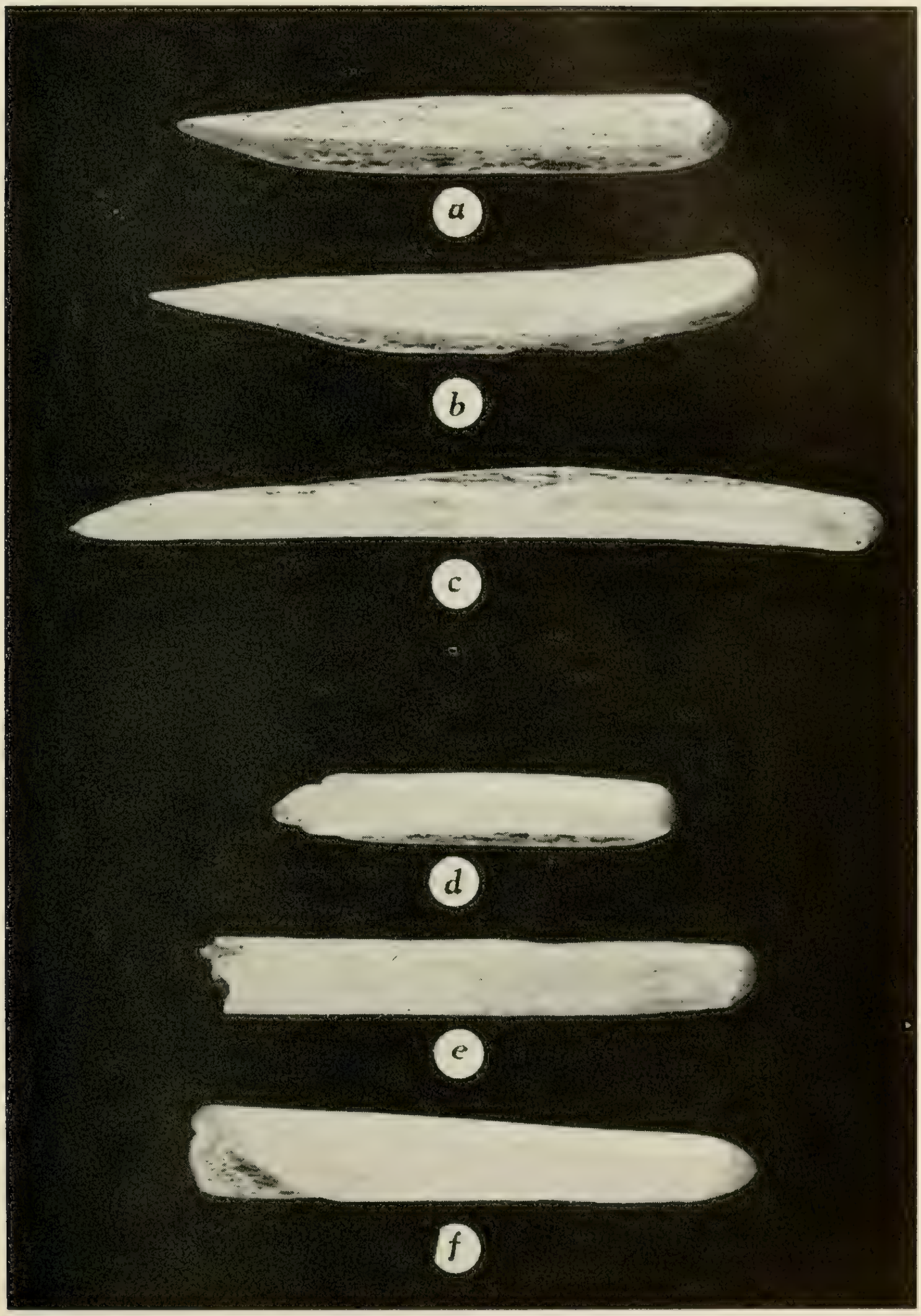
Sandstone abraders from 25HO21. (*b* is 4 cm. long.)



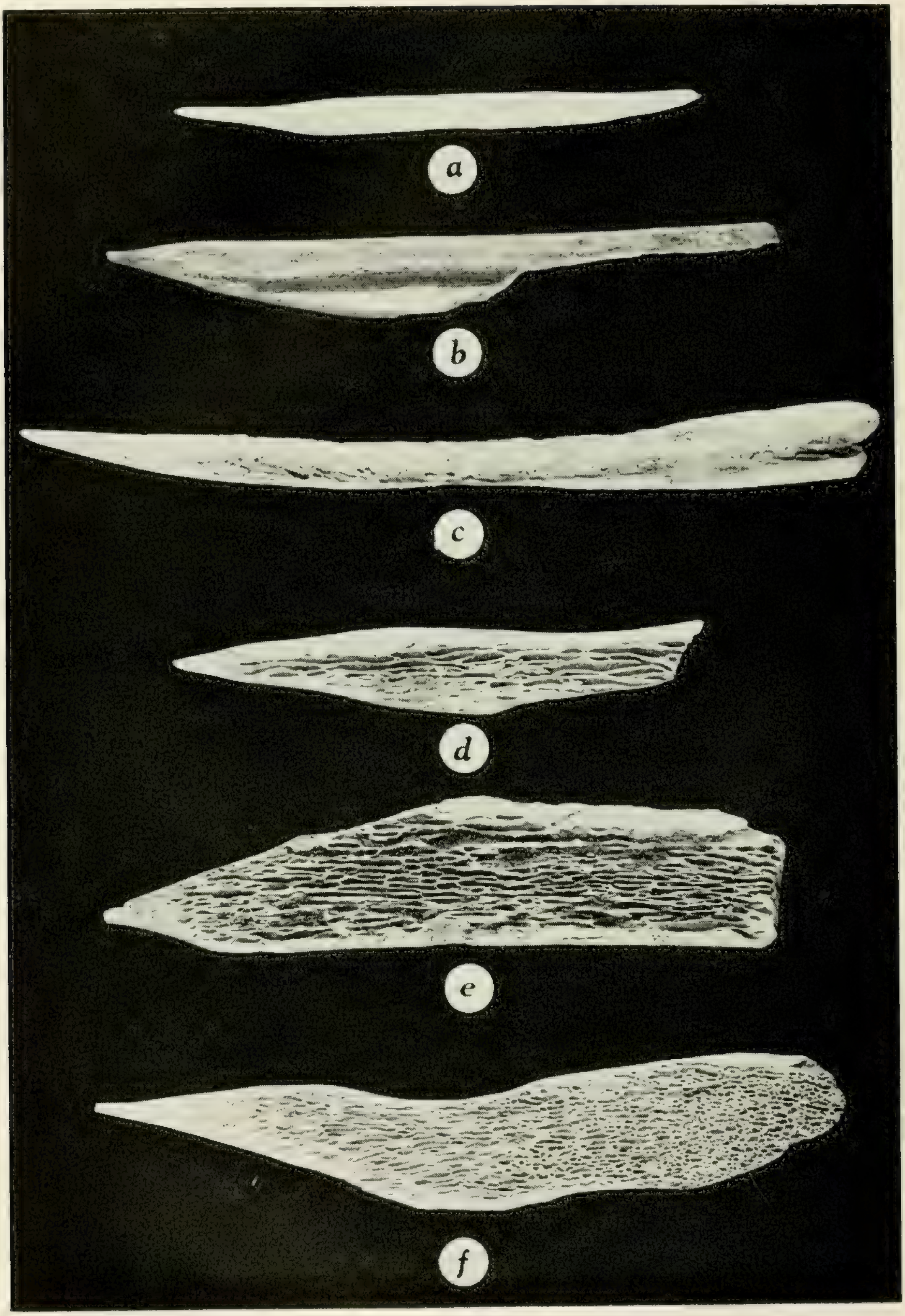
Ground stone artifacts from 25HO21. *a*, Hammer stone. *b*, Grinding or rubbing stone. (*a*, 19 cm. long.)


a
b
25HN37-
3351
c
d
e

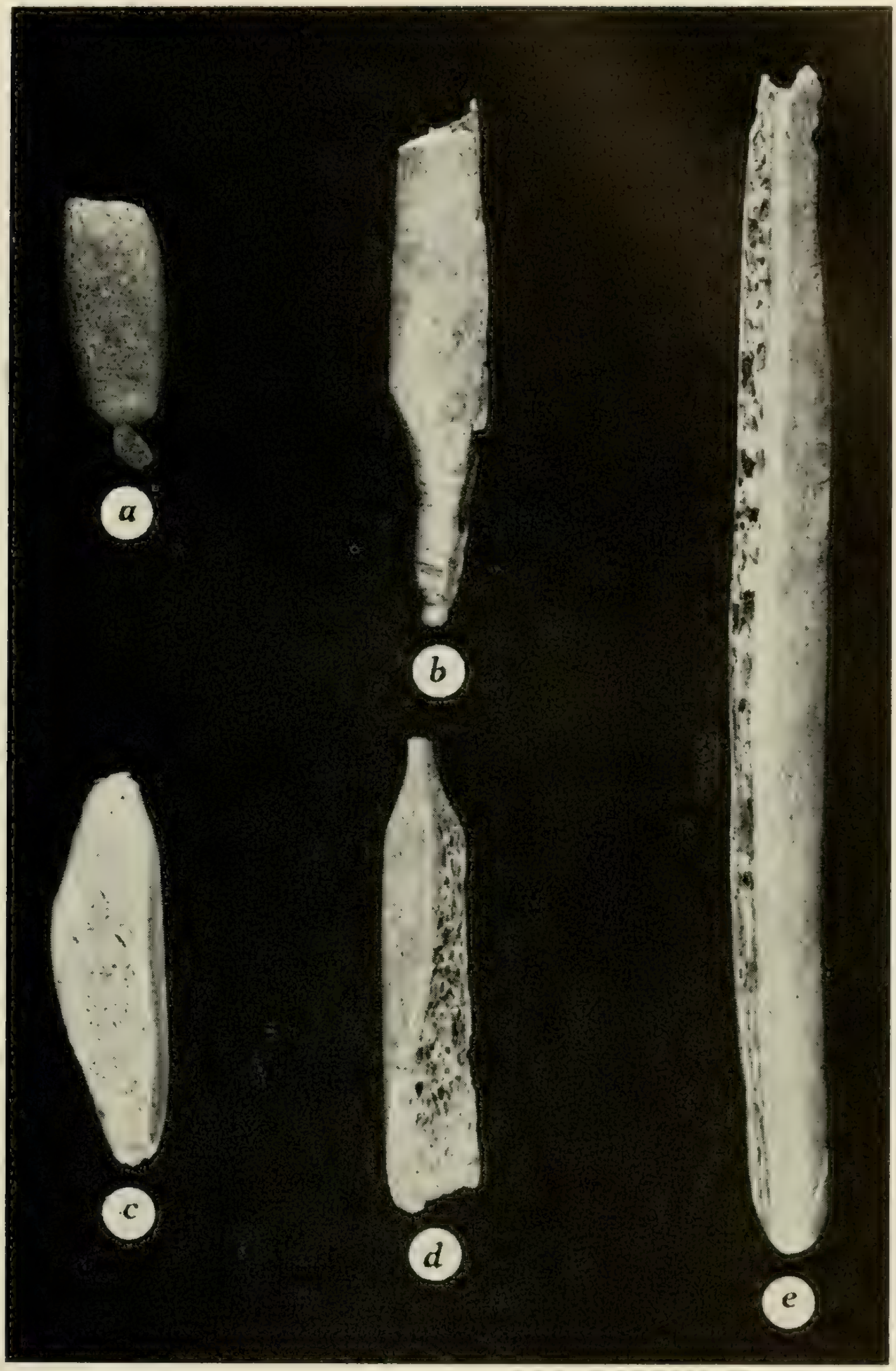
Worked bone from 25HN37. *a*, *b*, Beads. *c*, Shaft wrench. *d*, Butt of an awl or punch. *e*, Awl. (*b* is 4.2 cm. long.)



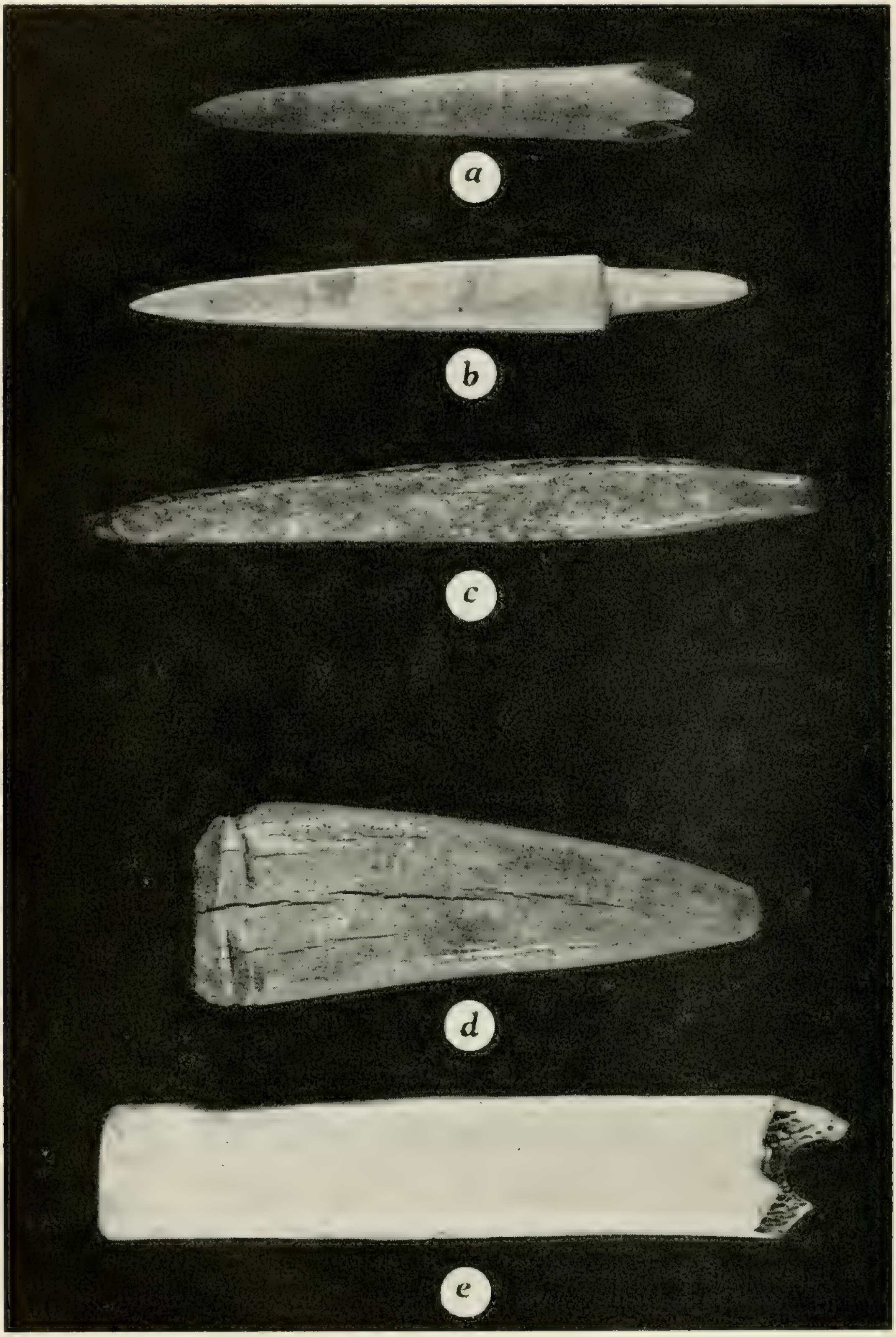
Triangular bone awls (*a–c*), awl butts (*d–e*), and bone "punch" (*f*). (*a* is 8.8 cm. long.)



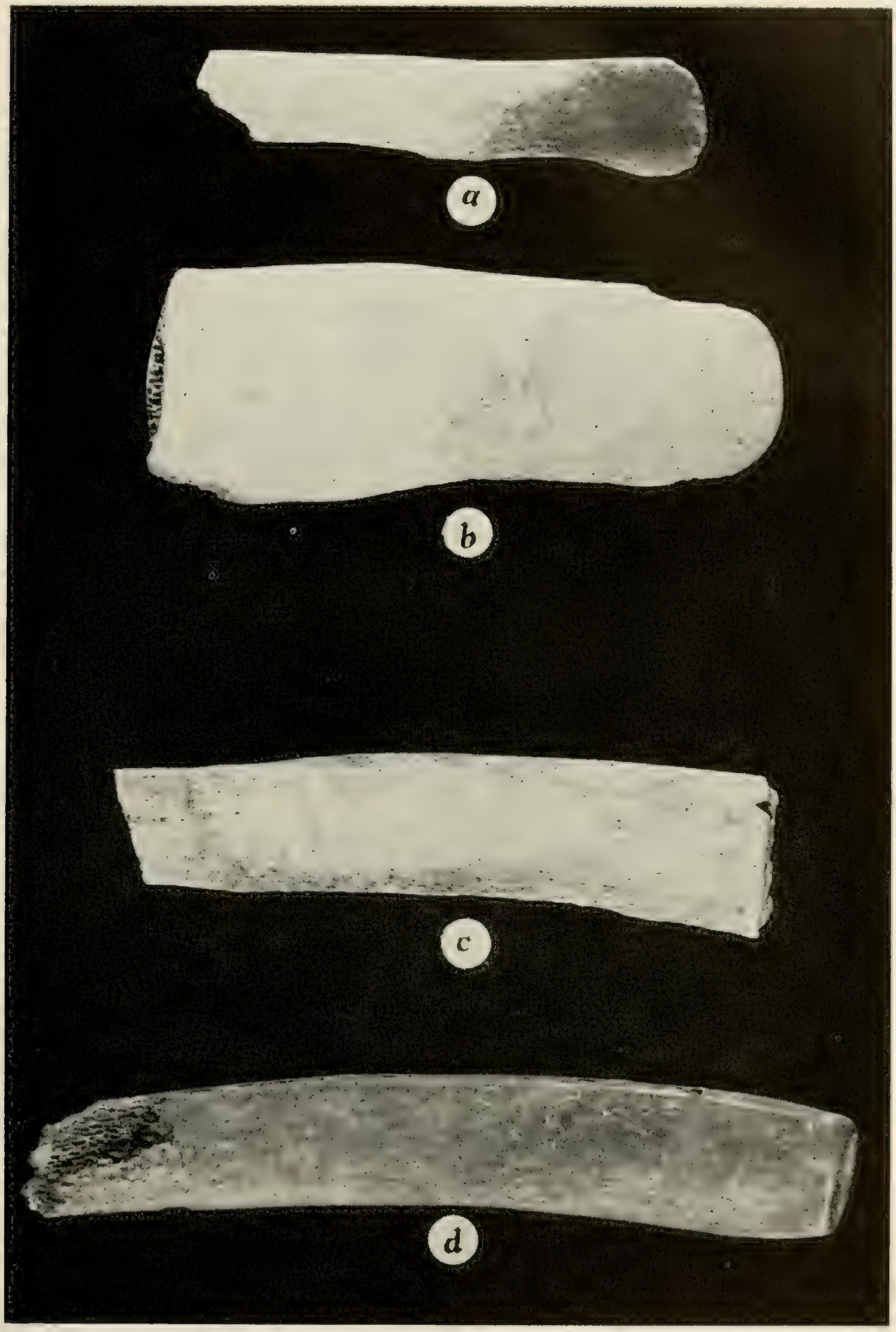
Splinter bone awls (*a–c*) and flat bone awls (*d–e*) from 25HO21. (*a* is 8.4 cm. long.)



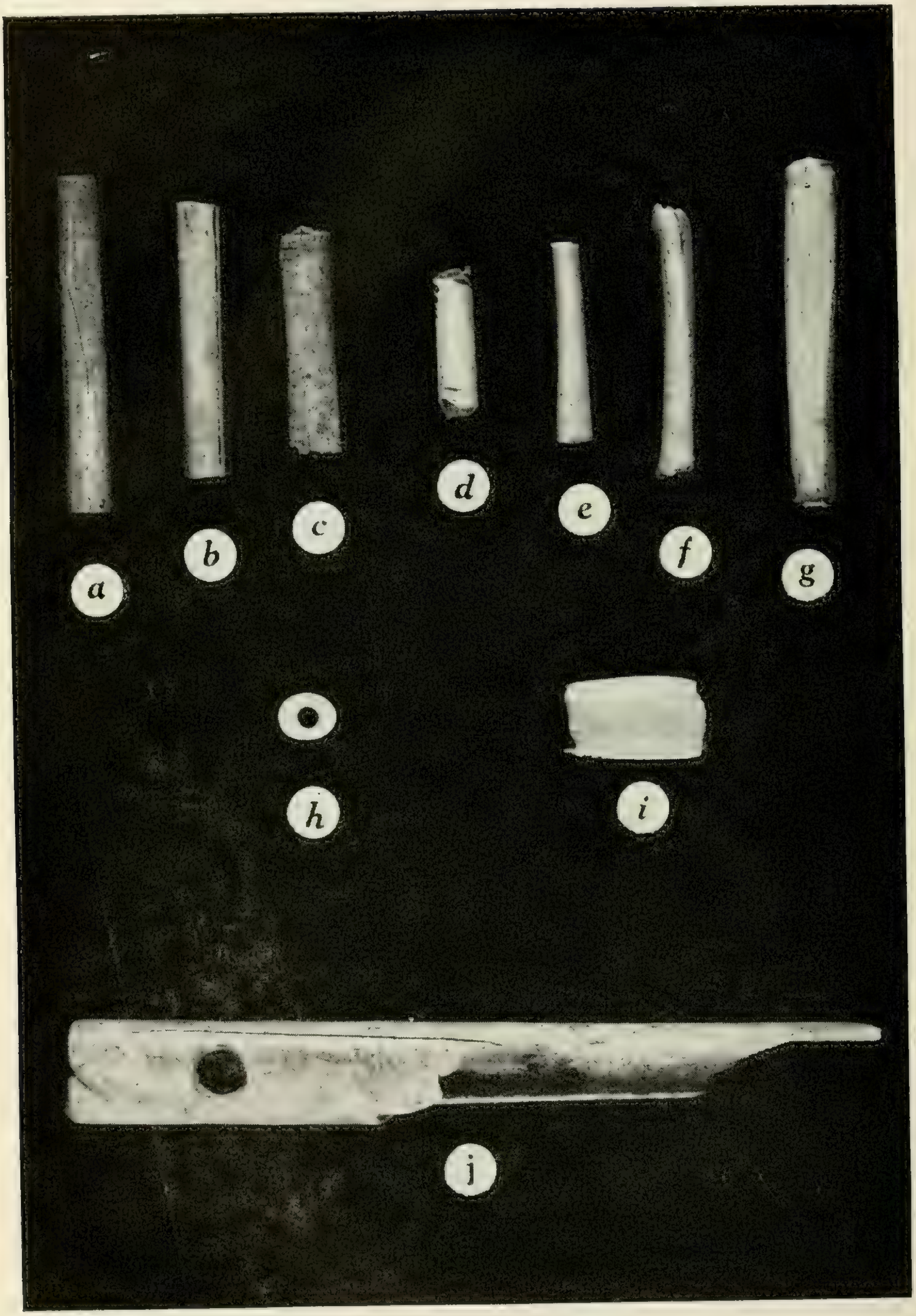
Worked bone from 25HO21: *a*, *c*, Scraps left from making bone projectile points(?). *b*, *d* Scraps left from making triangular awl. *e*, Blank for triangular awl. (*c* is 4.9 cm. long.)



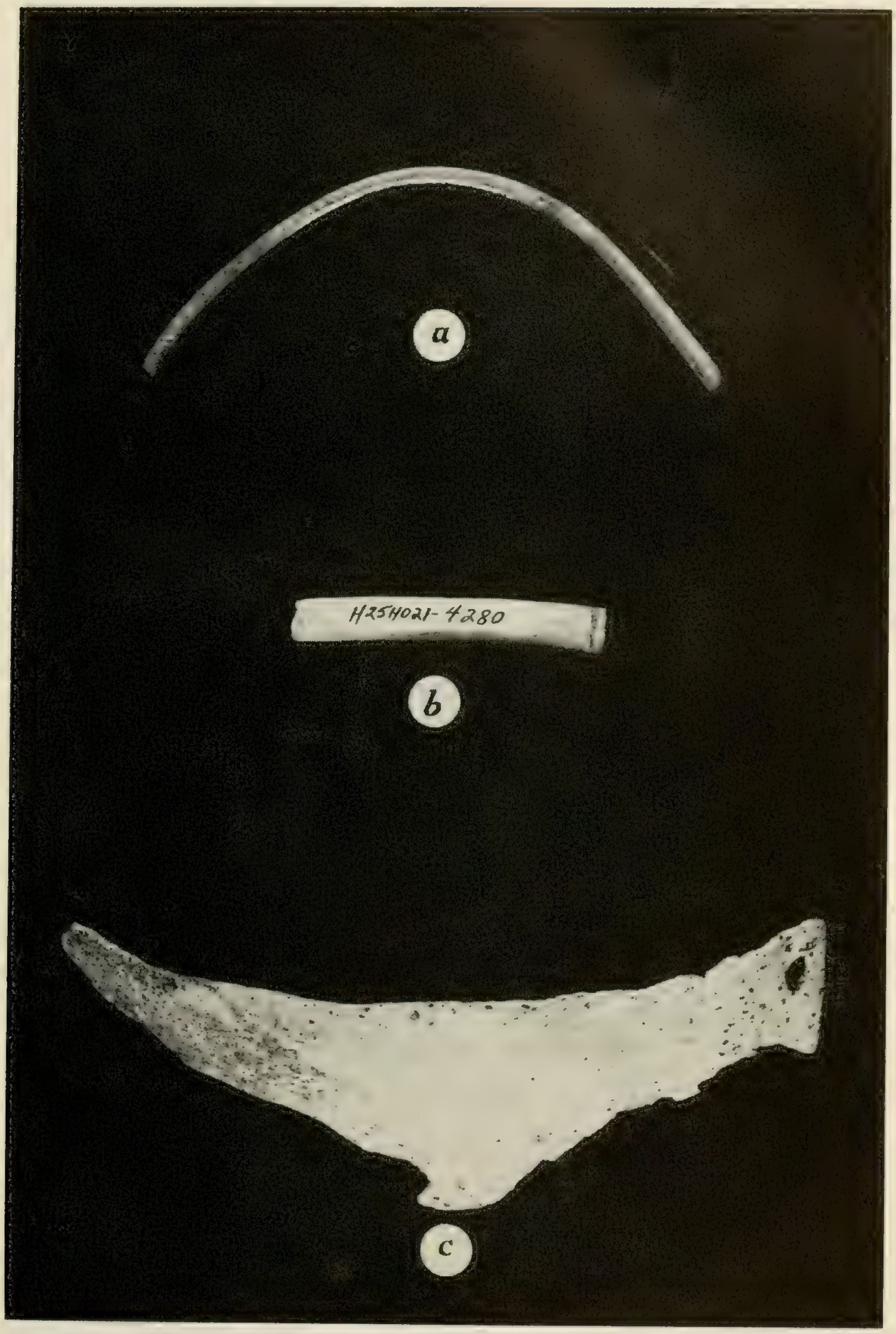
Bone and antler artifacts from 25HO21. *a*, *b*, Bone projectile points. *c*, Bone projectile point(?). *d*, Cut antler tine. *e*, Shaft wrench. (*b* is 9.6 cm. long.)



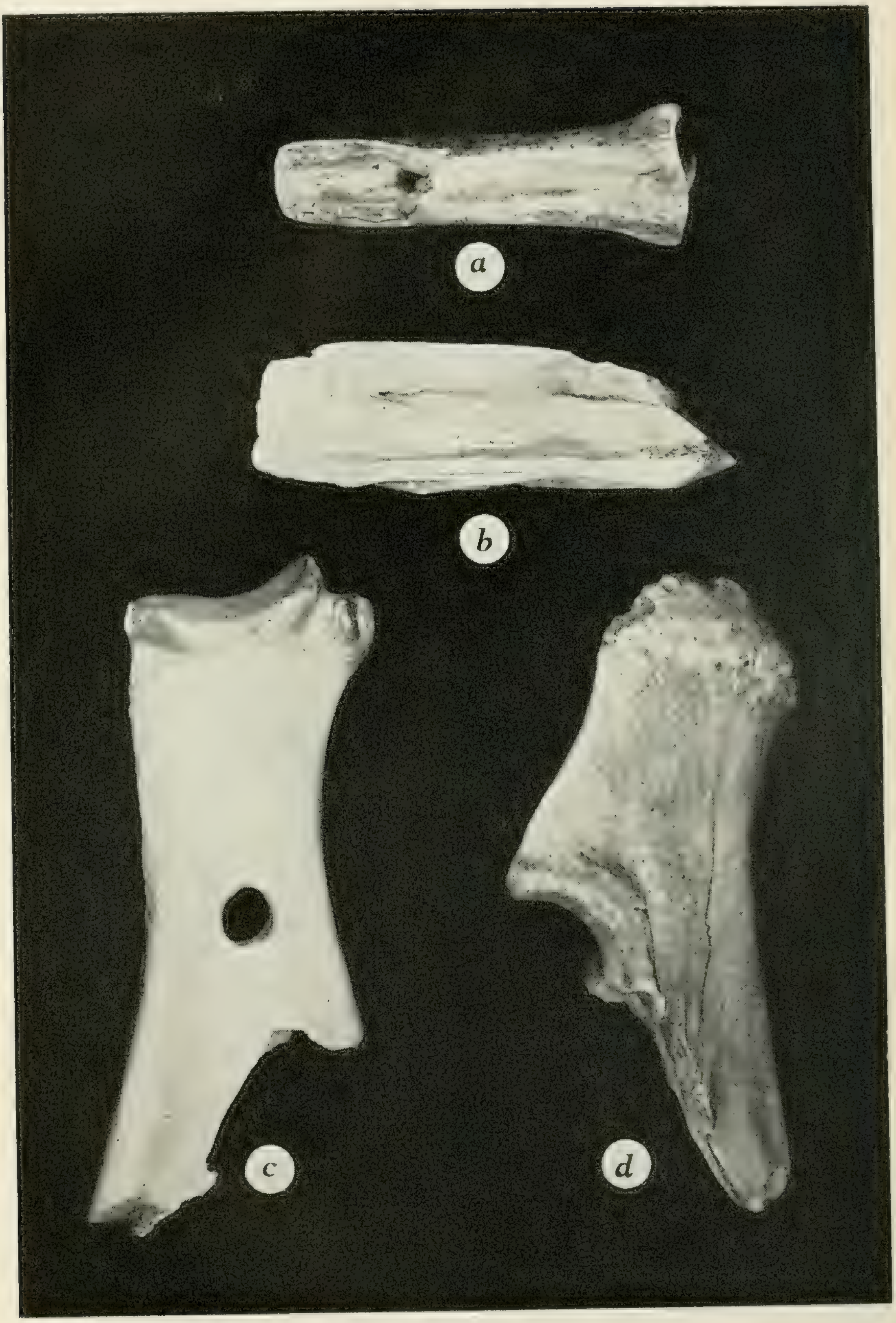
Bone spatulas (*a* and *b*) and worked rib sections (*c* and *d*) from 25HO21. (*a* is 7.9 cm. long.)


a
b
c
d
e
f
g
h
i
j

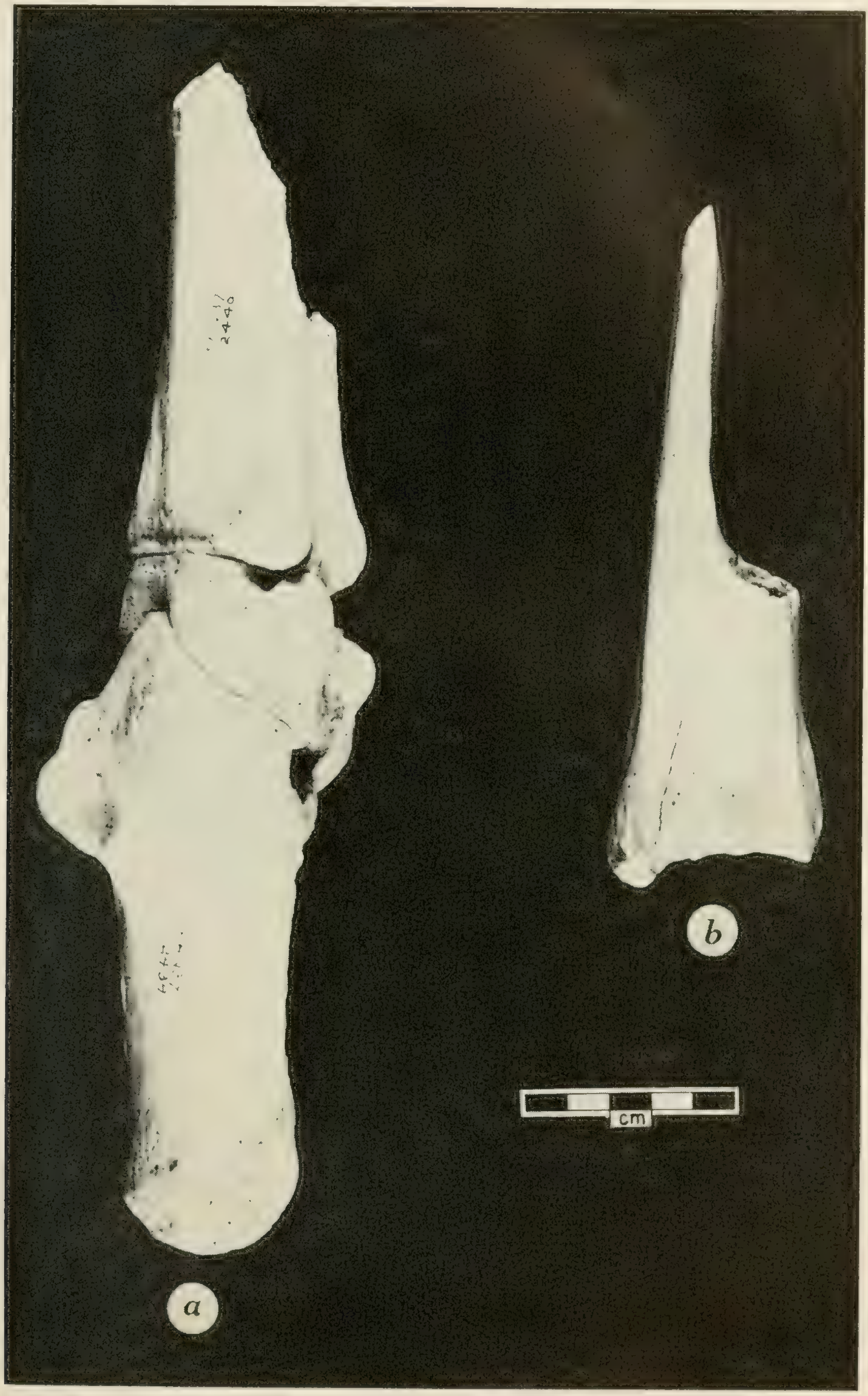
Worked bone from 25HO21. *a–i*, Beads. *j*, Whistle. (*a* is 4.7 cm. long.)


a
H25HO21-4280
b
c

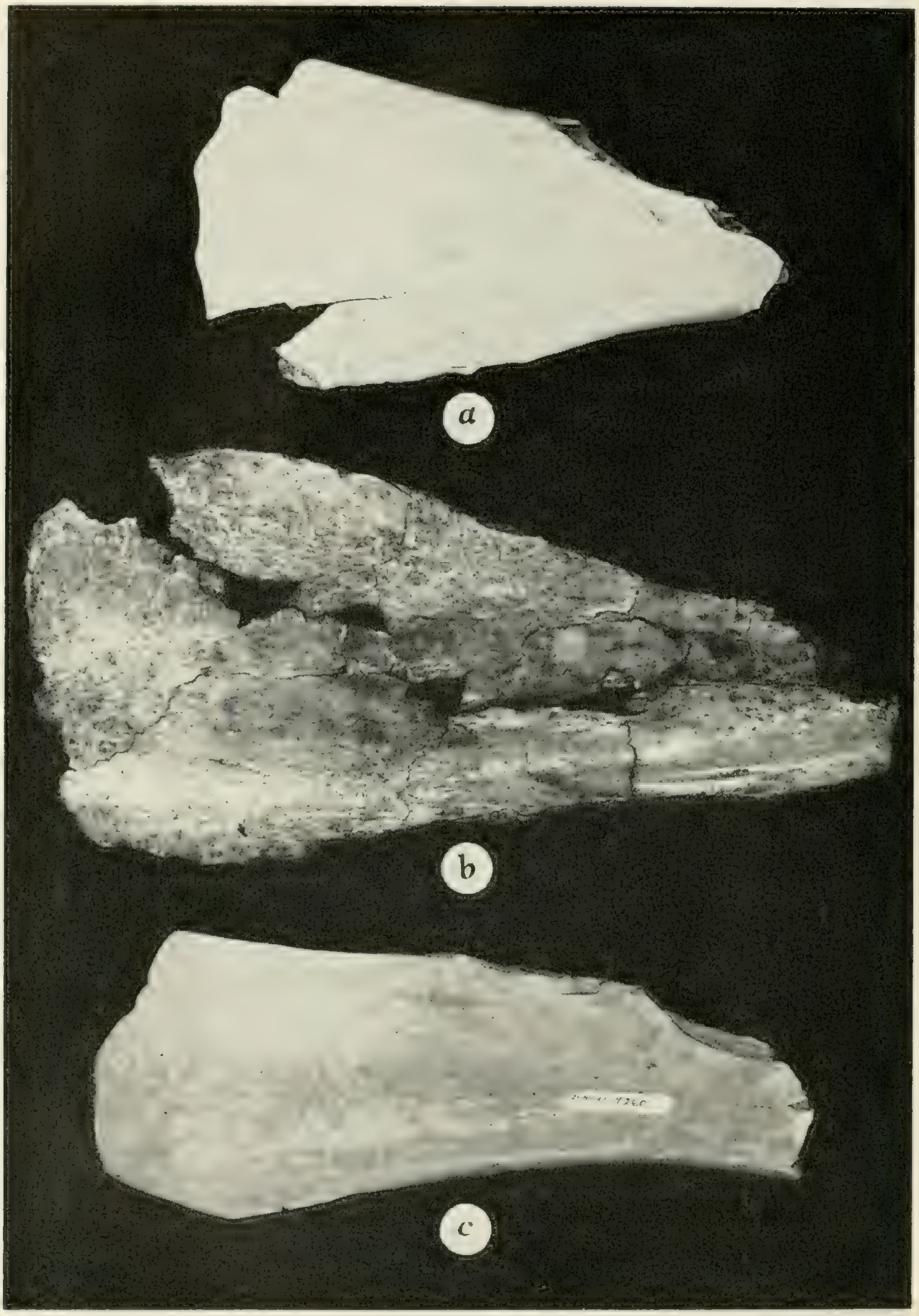
Worked bone from 25HO21. *a*, Broken-eyed needle(?). *b*, Needle fragment(?). *c*, Bracelet(?) or head band(?). (*b* is 4.4 cm. long.)



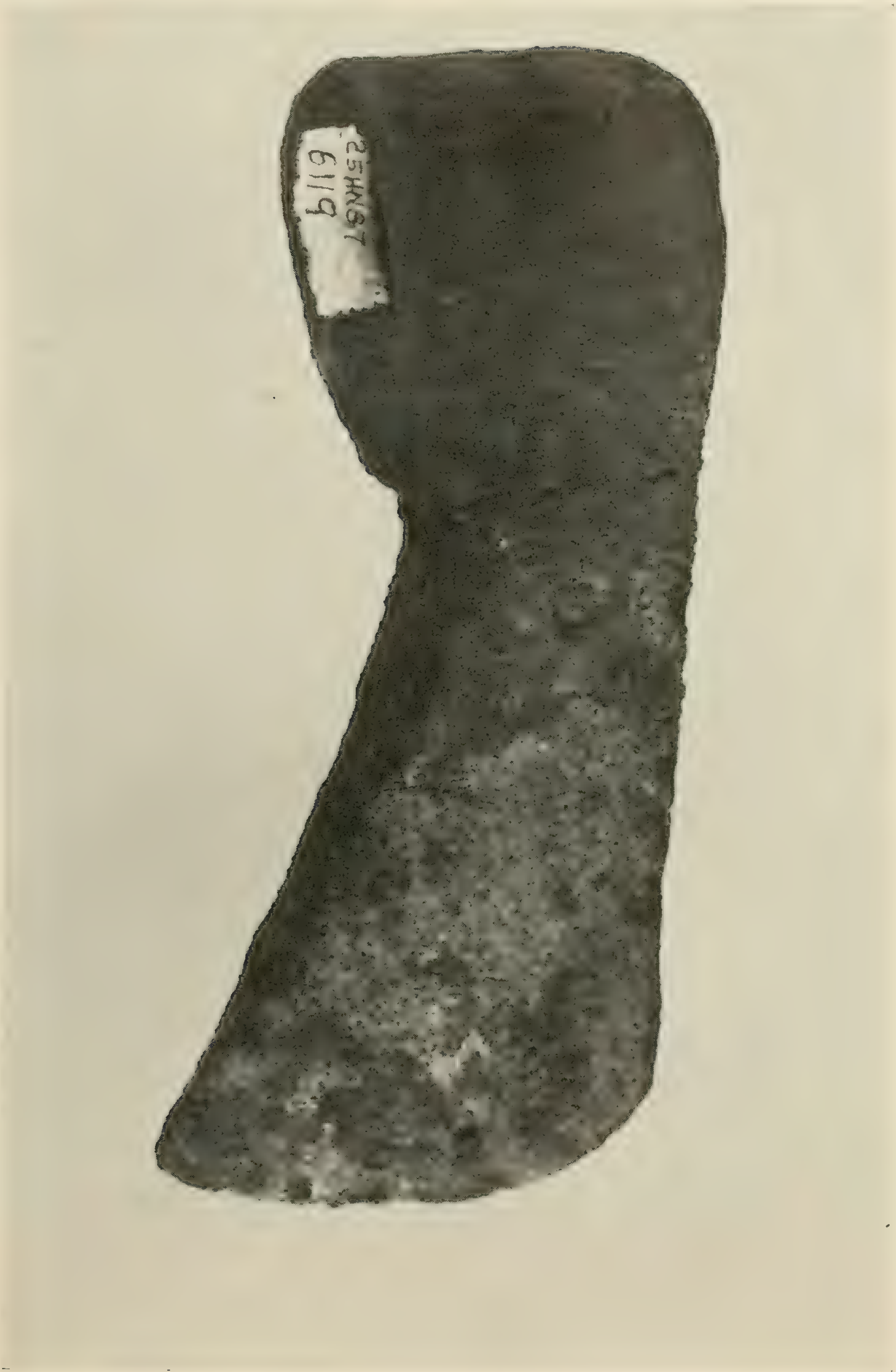
Bone tools from 25HO21. *a*, Metapodial flesher. *b*, Possible flesher. *c*, Ulna pick(?). (*a* is 7.1 cm. long.)



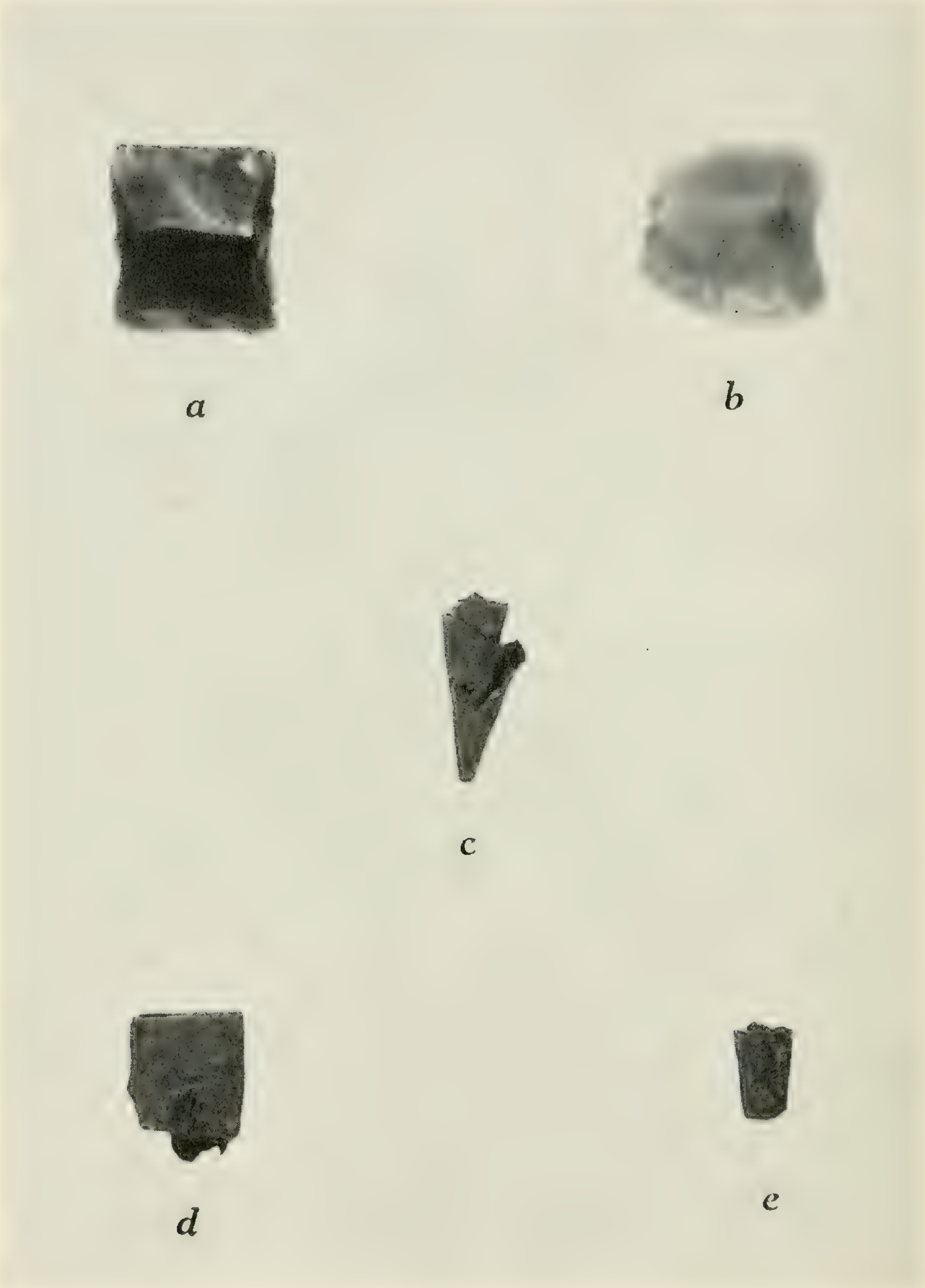
Bone fleshers from 25HN37. *a* is only partially finished.



Scapula digging tools. *a*, *c*, From 25HO21. *b*, From 25HN37. (*a* is 19 cm. long.)



Iron ax found in the fireplace of House VI, 25HN37. (16 cm. long.)



European trade items from 25HN37. *a,b*, Gun flints. *c–e*, Copper or brass jingles. (*c* is 2.5 cm. long.)

SMITHSONIAN INSTITUTION
Bureau of American Ethnology
Bulletin 173

Anthropological Papers, No. 59

THE USE OF THE ATLATL ON LAKE PATZCUARO, MICHOACAN

By M. W. STIRLING

CONTENTS

PAGE
Introduction 265
Use of the atlatl 265
Description of the atlatl 267

ILLUSTRATIONS

PLATES

FOLLOWING PAGE
39. Preparing to throw spear. *a*, First position. *b*, Method of engaging the spear 268
40. Preparing to throw spear. *a*, Second position. *b*, Final position 268
41. Four atlatls from Janitzio. Front and profile 268

THE USE OF THE ATLATL ON LAKE PATZCUARO, MICHOACAN

By M. W. Stirling

INTRODUCTION

In 1944, while engaged in archeological work for the National Geographic Society and the Smithsonian Institution, I visited Lake Patzcuaro in the State of Michoacan with Richard Stewart of the National Geographic Society. We took the opportunity of accompanying a small group of Tarascan Indians from the village of Janitzio, on a coot-hunting trip on the lake. The pictures that illustrate this article were taken by Stewart, who also made a kodachrome motion-picture record of the hunt.

USE OF THE ATLATL

As is well known to ethnologists, the use of the atlatl, or spear thrower, still persists on Lake Patzcuaro. The term "atlatl" is, of course, an Aztec word. The Tarascans call it "phatamu." Once employed throughout the Americas as the principal weapon of the aborigines, it was used many centuries before the bow and arrow. Curiously enough at the beginning of the 16th century when Europeans reached the New World, with the exception of a few scattered areas the spear thrower was extensively used only in the two most civilized regions, Middle America and Peru. This seems paradoxical at first glance, but the reason may be that in these regions of intensive agriculture, hunting had become unimportant, while to the wild tribes the superiority of the bow and arrow as a hunting weapon was more apparent.

That the atlatl was an effective weapon in warfare, as used by the Peruvians and Mexicans, is amply attested in the early Spanish chronicles. It is even possible that in close combat it was superior to the bow and arrow. Very elaborate carved spear throwers, embellished with gold and semiprecious stones, were used by military leaders in both Mexico and Peru.

It was not long after the Conquest that the atlatl went out of use as a weapon of war, but it persisted until recent years as a hunting implement among the Aztecs in the region of Xochimilco in the Valley of Mexico, and among the Tarascans on Lake Patzcuaro. Probably the only other region in the New World where the spear thrower has not entirely gone out of use is among the Nunivak Eskimo of western Alaska. Interestingly enough, here, too, it is used only for aquatic hunting, principally of birds but sometimes of sea otter and small seals. For land hunting the Nunivak use the bow and arrow. The hunting techniques in these two widely separated regions are very similar. The Eskimo approach a flock of "sitting" birds as closely as possible. As the flock rises from the water they launch the multipronged spear into its midst. The Tarascans do the same.

On Lake Patzcuaro, coots or mudhens are quite numerous and are hunted at almost any time. In the fall, migrating ducks of many species come to the lake in quantities, and this is the time most of the hunting is done.

On October 31, according to George Foster,[1] a large communal hunt is conducted. On this date as many as a thousand canoes, each containing several men, gather near Janitzio, the island village. The hunters form two large concentric rings with the canoes around the largest concentration of ducks. Those in the inner group approach and launch their spears simultaneously as the flock rises. The remaining ducks fly a short distance and usually alight in the space between the two rings. The outer ring then converges and repeats the attack. On this particular hunt thousands of ducks are killed. Except for this one day, duck hunting is an individual affair, from one to four canoes in a line stalking the birds.

On the occasion that Stewart and I went out as observers, there were two hunting canoes, each with a single occupant. The target was a large flock of coots. We approached very slowly, the canoes close together, stopping to drift from time to time. When we were within about 30 yards of the flock, the birds became uneasy and took flight. As they left the water, the two hunters rose to their feet and launched their spears into the mass of birds. On the first approach, one coot was hit, the other throw was a miss. Each hunter has two spears, and if the approach is close enough, he quickly throws the second.

The birds alighted about 300 yards away and we made a second approach. This time each man got a bird. We tried two more approaches, but by now the birds had grown wary and we could not get within range, so the hunters gave up.

The approach is made with the canoe pointed toward the flock. When the hunter is ready to throw, he quickly stands erect, with his left foot forward. The shaft of the spear is grasped near the middle and lifted by the left hand. At the same time the atlatl is grasped in the right hand, the index and middle fingers are inserted through the two holes, and the remaining fingers and the thumb grasp the handle. The spur is instantly engaged in the hollow at the butt of the spear shaft, the spear is lifted by the left hand to shoulder height and parallel to the water. In this position the shaft is released by the left hand and launched by the right with a sweeping overhand motion. The shaft is steadied in position, parallel to the long axis of the canoe until the instant the throw is started, the thumb and fingers grasping the atlatl handle.

---

[1] Empire's children: The people of Tzintzuntzan, by George M. Foster, Inst. Social Anthrop., Publ. No. 6, Washington, 1948.

DESCRIPTION OF THE ATLATL

The shaft of the spear is made from the giant reed (*Arundo donax*), an introduced species from Asia Minor that is now widespread in the Western Hemisphere.[2]

In aboriginal times it is probable that the native cane, *Gynerium sagittatum* called caña brava, was used. However, this is much heavier than the introduced species and its use was probably abandoned when the lighter cane became available. This is not only easier to throw, but it floats. It is cut at the butt of the shaft just below one of the joints, so as to leave a hollow receptacle for the spur of the atlatl. The forepart is cut about 6 inches from the joint. Into the opening thus formed are inserted the three wires, whose wide-spreading points form the leister. The entire shaft is about 9 feet long.

The atlatl itself is carved from "palo azul" wood and is about 24 inches in length. It is concave on the under side and convex on the upper so that in cross section it is more or less U-shaped. Just before the handle it becomes broad and flat so as to admit the two finger holes. The handle itself is rectanguloid to cylindrical in cross section. The upper end of the grooved under surface ends in the spur which engages the butt of the spear. Above this on the upper surface is a larger spur, or hook, which is used to retrieve the floating spears from the water.

The manufacture of atlatls is carried on by a few specialists in Janitzio who sell them to the hunters for about a peso to a peso and a half. The spears are sold for about the same amount.

Atlatls are frequently depicted in the native codices and at still earlier periods in carvings on stone monuments, both by the Aztecs and the Maya.[3]

Invariably these are represented as very much shorter than the Tarascan specimens, but I believe that this is the result of artistic conventionalization. More than a dozen elaborately carved and decorated Mexican atlatls have been preserved from the time of the Conquest.[4]

---

[2] Botanical identifications by Dr. F. A. McClure, of the Department of Botany, U. S. National Museum.

[3] The atlatl or spear-thrower of the ancient Mexicans, by Zelia Nuttall, Archeol. and Ethnol. Pap., Peabody Museum, Harvard University, vol. I, No. 3, 1891.

These vary in length from a little over 20 inches to 24⅜ inches, which makes them approximately of the same proportions as the Tarascan examples. It is probable that the efficiency of the implement would be impaired if it varied too much from the 20- to 24-inch range.

In addition to these actual examples of early atlatls, there are a good many descriptions written by 16th-century chroniclers, which, together with the native illustrations, show that at least three types of atlatl were utilized.

The spears, too, are described with some frequency by the early writers. Torquemada records a tradition in which Huitzilopochtli, god of war, gave the Aztecs the weapons with which they fought, "long spears made of cane stalks and tipped with obsidian, which they threw with a certain implement called 'atlatl.' "

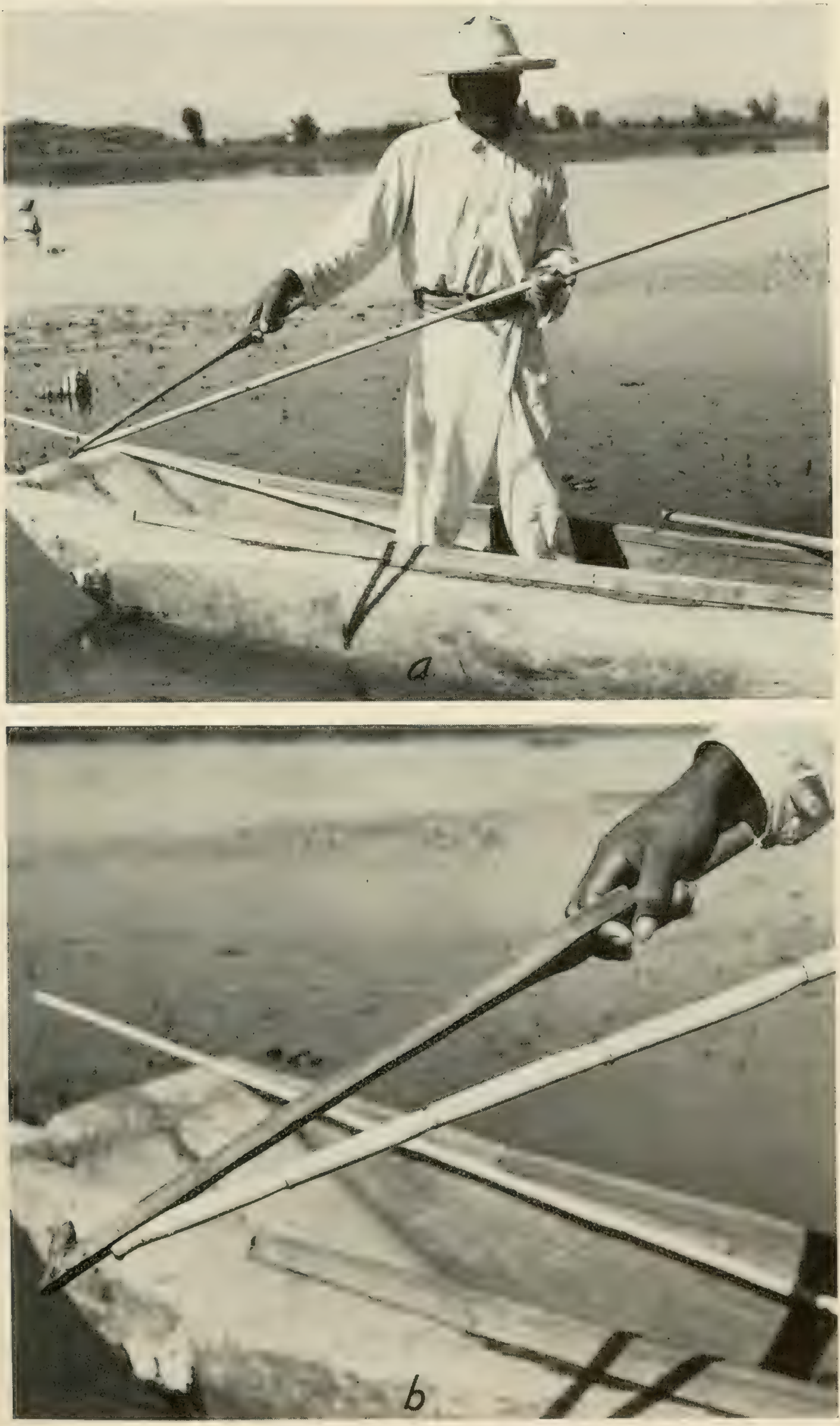
The anonymous conqueror, who was one of the recorders of the Cortez Conquest, speaks of "spears thrown by a crossbow made of another piece of wood. These spears were tipped with obsidian, or with very sharp strong fish bones. Some had three points and inflicted three wounds at once."

Zelia Nuttall makes an interesting observation as to the possible derivation of the term "atlatl": "Considering that the original use of the atlatl was in aquatic chase by the atlacatl, or fishermen, whose name is a synthesis of *atl*, water, and *tlacatl* men, I venture the suggestion that the word "atlatl" may primarily have been a synthesis formed with the verbal noun *tlatlacani*, thrower, and *atl*, water. This would give the word *atlatlacani* meaning 'water thrower.' "

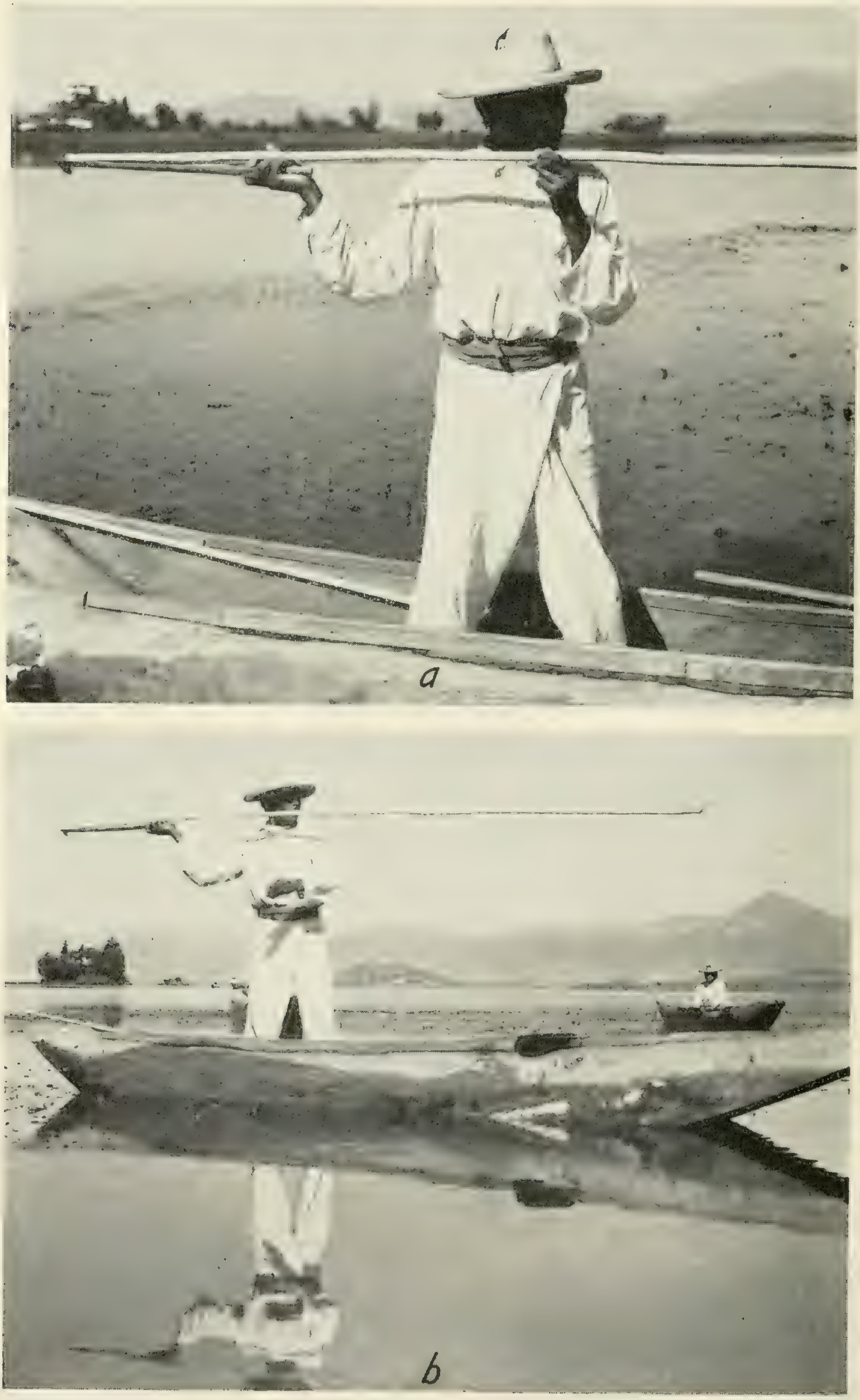
It seems clear that the atlatl and spear, as used on Lake Patzcuaro today, is in almost every respect the same implement that was used in pre-Columbian times. The iron prongs now used in place of fish bones, or fire-hardened wood, are about the only concession to modern times. It can be assumed that the methods of using this interesting device are also the same as those employed five centuries ago.

---

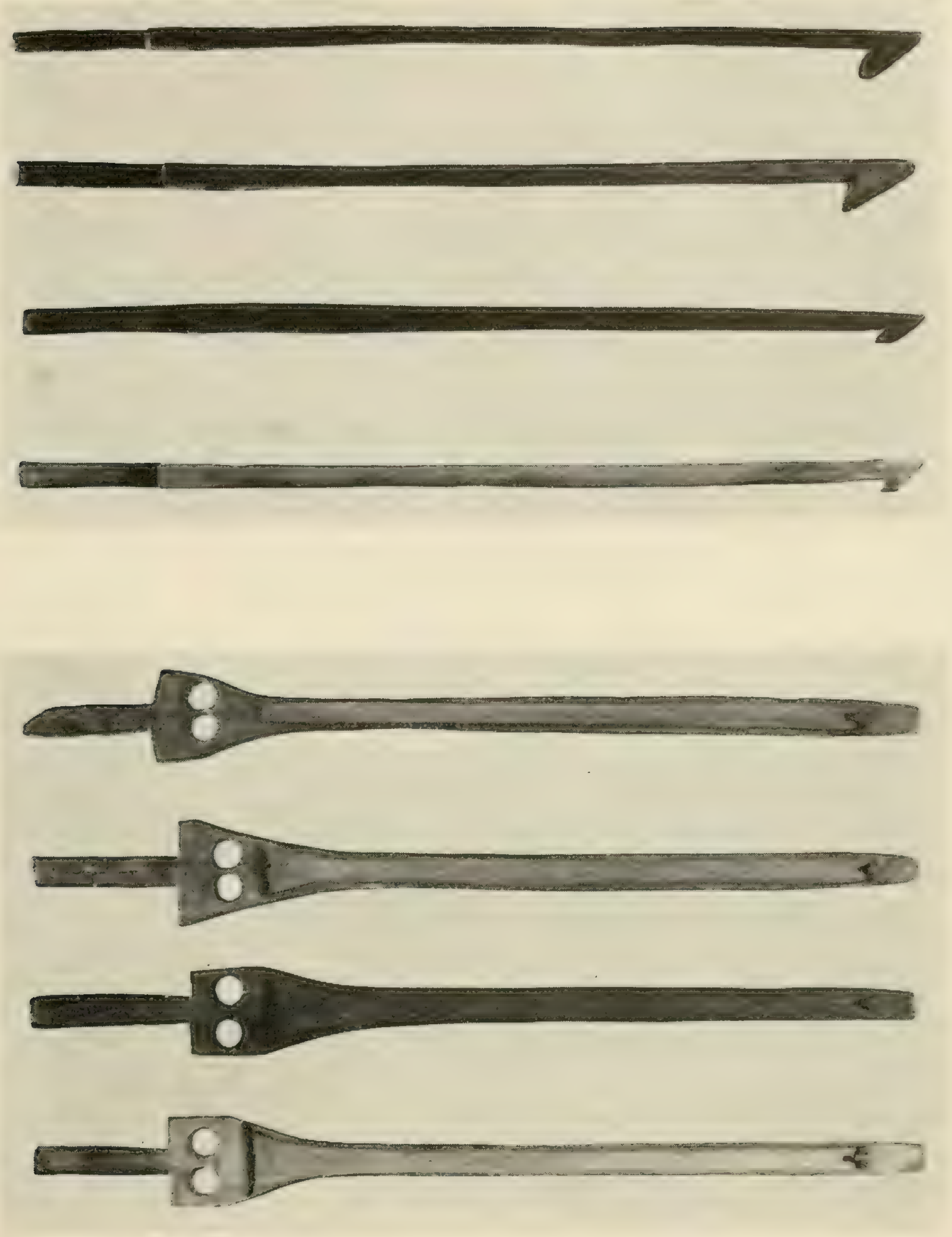
[4] The wood carver's art in ancient Mexico, by Marshall H. Saville, Mus. Amer. Indians, Heye Foundation, Contr., vol. 9, 1925.



Preparing to throw spear. *a*, First position. *b*, Method of engaging the spear.



Preparing to throw spear. *a*, Second position. *b*, Final position.



Four atlatls from Janitzio. Front and profile.

SMITHSONIAN INSTITUTION
Bureau of American Ethnology
Bulletin 173

Anthropological Papers, No. 60

A CAROLINE ISLANDS SCRIPT

By SAUL H. RIESENBERG and SHIGERU KANESHIRO

471762—60——19

CONTENTS

PAGE
Introduction 273
Type 1 script 273
Type 2 script 277
Present-day knowledge and distribution of the writing 279
Number and sequence of characters 282
Origin of the writing 282
  Distinctness of the two types 282
  Similarity of Type 2 script to the alphabet 283
  Syllabic values 283
  Type 2 history reconstructed 284
    Possible sources 284
    Linguistic affiliations 287
    The alphabet of Truk 287
    Alfred Snelling and the Trukese castaways 288
    Adoption of the Trukese characters 290
    Spread of Type 2 writing 293
  Type 1 history 294
    Invention at Faraulep 295
    Foreign influence 296
    Date of invention 297
    Derivation of characters 297
Analysis of the writing 299
  Phonemes, phonemic combinations, and characters 299
  Length of vowel not distinguished 300
  Vowel characters 302
  Lack of exact correspondence of characters and syllables 303
  Effect of dialects 304
  Representation of final consonants 305
  Comparison of native texts 307
Summary 309
Literature cited 311
Tables 313

ILLUSTRATIONS

PLATES

FOLLOWING PAGE
42. Tattooing in native script on arm of Maralatuy, a woman of Faraulep Island, Faraulep atoll. (Photographed by E. Quackenbush.) 334
43. Tattooing in native scrip on leg of Letaweribul, a woman of Falalap Island, Woleai atoll. (Photographed by E. Quackenbush.) 334
44. Native script and Japanese *katakana* on canoe-house beams, Faraulep Island, Faraulep atoll. (*a*, *b*, Photographed by S. Kaneshiro; *c*, photographed by E. Quackenbush.) 334

TEXT FIGURES

PAGE
25. Type 1 symbols and values (facing) 274
26. Type 2 symbols and values (facing) 278
27. Paragraph from Smith's roman text (1951, pp. 3–4) as written in native script by R. of Ifaluk 308
28. A page of text from a song written by R., a man of Ifaluk 310

MAP

1. Area of the occurrence of the script 281

A CAROLINE ISLANDS SCRIPT

By Saul H. Riesenberg and Shigeru Kaneshiro [1]

INTRODUCTION

The existence of a peculiar system of writing in the Woleai Islands [2] has received almost no attention from ethnologists or paleographers, and none at all from linguists. It is a script which, the present writers are convinced, has developed in consequence of stimulus diffusion, to use Kroeber's term, and as such is to be reckoned among the small number of scripts so originating, such as the Bamun ideographic script and the Vai and Cherokee syllabaries. It is the purpose of this paper to explain its origin and development and to analyze its form, content, and use.

TYPE 1 SCRIPT

The first published notice of a Caroline writing was made by J. Macmillan Brown (1914, pp. 89–91; 1927, pp. 117–120). In 1913 he paid a brief visit to Woleai atoll, where a chief, Egilimar by name, wrote for him a sentence in the native script; later he received a list of 51 characters and their phonetic values. Brown did not inquire into or was not told anything of the origin of the writing. The list is reproduced here in column B of figure 25. It is the type of writing which we will refer to hereafter as Type 1. As Brown points out, the symbols do not resemble those of any system known from elsewhere.

> The script is now known only to five men on the islet and to some in Faraulep, an islet a hundred miles distant. But it is probably a relic of a wide usage in the archipelago. There is no possibility of any one of the five having invented it. . . . This Oleai script is manifestly the product of long ages for the use of the

---

[1] The authors are indebted to Drs. A. L. Kroeber and William Sturtevant for advice and criticism, to Dr. Y. Uyehara for assistance with Japanese characters, to Dr. Ward Goodenough for advice on Trukese linguistics, to Dr. S. H. Elbert for critical reading of the text and for assistance with tape recordings, and to Mr. Frank Mahony who obtained considerable information incorporated in the text from Truk and surrounding islands. Several students from Micronesia at the University of Hawaii were also of much help, among them Tosiwo Nakayama of Truk, Bethwel Henry and Bailey Olter from Ponape, Nicholas Leon y Guerrero from Saipan, Edmund Gilmar from Yap, and David Ramarui from Palau.

[2] The term "Woleai" as generally used has two meanings: Woleai atoll itself; and the whole Woleai group in the Central Carolines, consisting of Woleai atoll, Eauripik, Ifaluk, Faraulep, Gaferut, Olimarao, Elato, Lamotrek, West Fayu, Satawal, and Pikelot. Of these islands, Gaferut, Olimarao, West Fayu, and Pikelot are uninhabited. The group is often referred to also as simply "the Woleai." Just to the east of the group lie Puluwat, Pulusuk, and Pulap, known today at Truk as "the Western islands;" we will be concerned in this paper with Puluwat.

Explanatory notes for figure 25

Column

A. Numbers assigned to characters and used in text. Numbering after Brown's sequence, 1 to 51, and arbitrarily thereafter.
B. Brown (1927, p. 118). Brown's sequence, characters, and attributed values. Woleai, 1913.
C. Damm (1938, fig. 279). Sequence and characters from wooden board. Faraulep, 1909.
D. Damm (1938, fig. 280). Characters from beams of men's house. Faraulep, 1909.
E. Krämer (1937, pl. 15 and fig. 109). Characters from canoe and bamboo box. Woleai, 1909.
F. Damm and Sarfert (1935, figs. 128, 272). Characters from tinderbox and flute. Satawal and Puluwat, 1909.
G. Someki (1936, fig. 5, p. 178; 1945, figs. 189, 230). Characters and attributed values. Presumably Faraulep, Ifaluk, and Elato, 1934.
H. M. of Pigue, Faraulep, 1954. Sequence, characters, and attributed values in Smith's orthography.
I., J., K. C. of Pigue, Faraulep: 1955A, 1955B, and 1956. Sequence, characters, and attributed values; attributed values of column J in Smith's orthography.
L. L. of Pigue, Faraulep, 1957. Characters and attributed values.
M. N. of Pigue, Faraulep, 1957. Characters and attributed values.
N., O. R. of Ifaluk; 1955 and 1957A. Sequence, characters, and attributed values in Smith's orthography.
P., Q. T. of Lamotrek; 1955 and 1957. Sequence, characters, and attributed values in Smith's orthography.
R. B. of Falalap, Woleai, 1957. Sequence, characters, and attributed values.
S. A. of Falalap, Woleai, 1957. Sequence, characters, and attributed values.
T. S. of Ifaluk, 1955. Characters.

REMARKS

1. Positions in sequence of column A assigned to characters in columns D, E, F, G, L, M, and T by comparison of form of character, and of value if given, with form and value of characters of the other columns.
2. Bracketed characters are those not given in informants' lists but occurring in word samples; or are variant forms from word samples.
3. Values in columns B and G are as given by Brown and Someki respectively. Attributed values in columns H, J, N, O, P, and Q are based on hearing of tape recordings and are in Smith's orthography, except those in parentheses, which were heard under hurried field conditions. Attributed values in columns I, R, and S, in parentheses, not taped; are given as roughly recorded in field. Attributed values in columns K, L, and M, in parentheses, not taped; values were written by these informants in Japanese *katakana*, and are here shown in the orthography used by Prof. Y. Uyehara of the University of Hawaii, who has transcribed the *katakana* characters for us.*
4. Underlining of numbers in various columns indicates the place up to which informants' sequences match the sequence of Brown (column B).

---

*The *katakana* used by Woleai natives is a quite unorthodox one, and some of the combinations used are apparently intended to form sounds impossible in Japanese. Thus, the device known as *nigori* or *chonchon*, used in Japanese writing to transform a character representing a surd consonant into a sonant consonant, is used by C. and N. (columns K and M) for various other purposes; e. g., it is used by both C. and N. as part of values of characters 21, 22, and 34, and seems to be intended in these instances to convert *m* to *mw* or *r* to *rw*; in other cases it is apparently meant to achieve vowel values intermediate between two Japanese ones (e. g., characters 9, 10, 31, 57). Various combinations of *katakana* characters are transliterated by us with hyphenated values, and seem also to be intended to form vowels absent in Japanese.

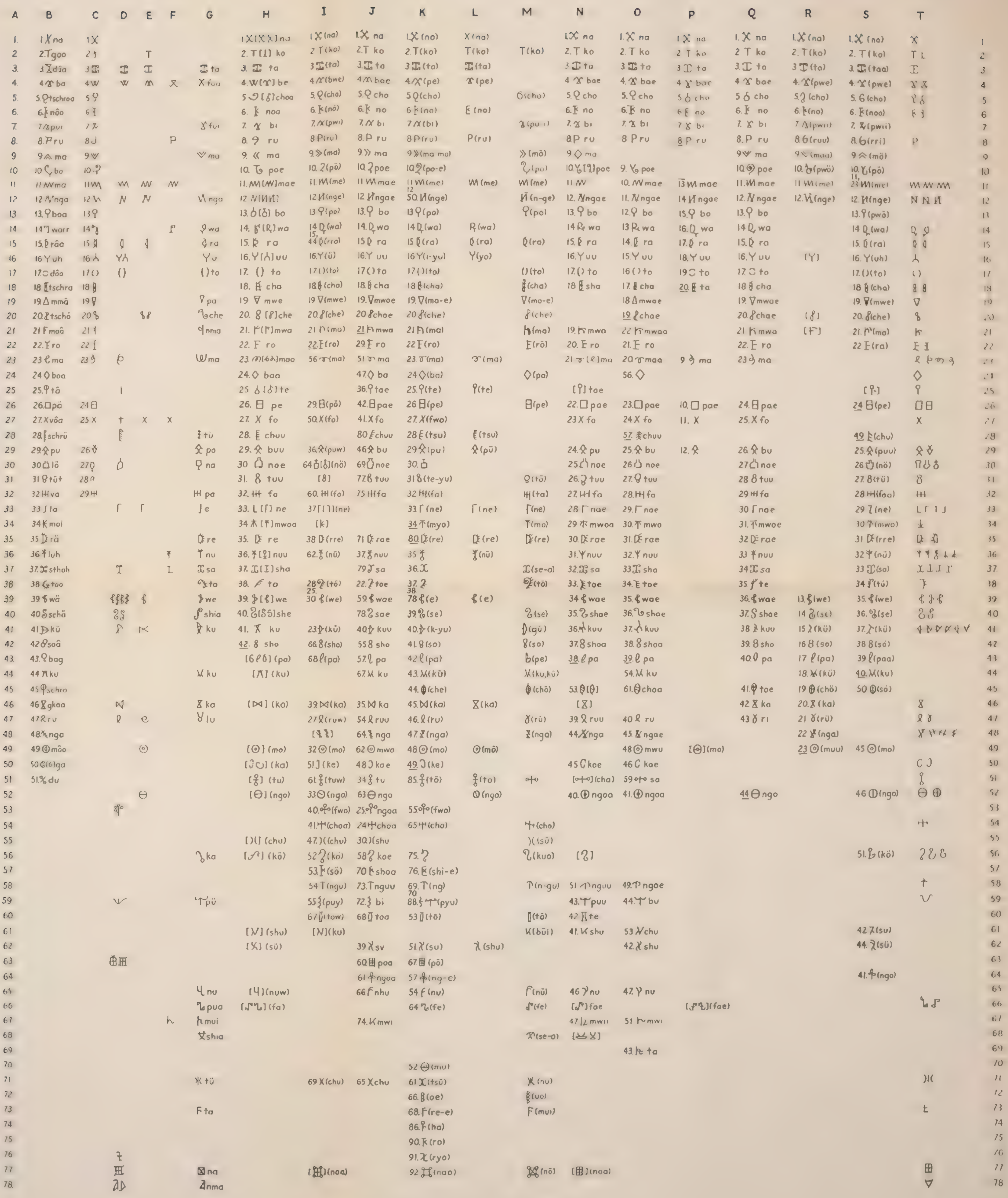


FIGURE 25.—Type 1 symbols and values.

(For explanation, see opposite page.)

471762 O-60 (Face p. 274)

> organisers of a highly-organised community of considerable size. In other words, it must have belonged to the ruling class of an empire of some extent, that needed constant record of the facts of intercourse and organisation.[3]

There are some scattered references to Brown's discovery, but few writers have commented on it even briefly. Mason (1920, p. 152) accepts Brown's opinion, quoted above, uncritically. Diringer (1948, p. 448), agreeing in part with Brown, states that

> the origin of the Woleai script is perhaps in some way connected with the Further Indian branch of scripts, although this connection does not appear evident, either from the graphic or from the phonetic points of view. There is, however, the possibility of the mixed process of invention and borrowing, called "idea diffusion."

And Imbelloni (1951, p. 164 and fig. 25), in an attempt to link the script to Easter Island writing and other scripts of his "Indo-Pacific" graphic system, refers to it as being based on Semitic syllabaries and having diffused to the Carolines via India and Malaya; he too regards it as the remains of a formerly more developed system. A more sober judgment is that of Métraux (1957, p. 199), who says that the script may very well have been "invented on the spot under the influence of Malay, Indian, or even European writing."

These theories derive entirely from Brown's report. Earlier than Brown, in 1909, the Hamburg Südsee Expedition had visited Woleai and neighboring atolls, but the reports of ethnographic work on these islands were not published until 1935 and later. These publications do not discuss or even refer to the Type 1 writing, but they contain illustrations of objects which bear the same characters. One of the authors, Damm (1938, fig. 279), copied from a wooden board which he found at Faraulep a series of 29 symbols.[4] This series is reproduced here as column C of figure 25. As will be seen by comparing these Faraulep symbols with those from Woleai in column B, there is virtual identity in graphic form and in sequence, as far as they go. Brown's characters Nos. 24, 25, and 28 do not appear, and his character 31 does not seem very like the one in corresponding position in the Faraulep series, but otherwise they are alike. Apparently the board represents the effort of someone to set down in proper order an already defined set of symbols, perhaps for instructional purposes.

There is also a line of characters copied by Damm from a beam in a men's house at Faraulep (1938, fig. 280). These are not a series, but constitute a sentence of actual writing.[5] Occurring in these lines are 11 of the above 29 characters, 8 more characters which are not among the 29 but appear on Brown's list, including the missing No. 28, and two others which are only on lists furnished us by our present-day informants (fig. 25, col. D). In addition, the Südsee Expedition volumes contain illustrations of a bamboo tinderbox and two canoes from Woleai, a Puluwat nose flute, and a tinderbox labeled "Satowal bzw. Polowat," all of them incised or painted with characters of the same type (fig. 25, cols. E and F).

---

[3] Brown, 1927, p. 119. This is perhaps not so fantastic an idea as might at first appear, for the Yap "empire," a religio-political hegemony which once may have stretched beyond Truk to the east, still includes in its domain all of the Woleais. But the Yapese themselves, who control the "empire," do not possess any native script.

[4] This is the only instance of writing in which the symbols run from right to left, as reproduced by Damm. But it is very likely that the board from which the figure was taken was held upside down by the copier. It is impossible to tell from the characters themselves if this was so, since, as will be seen from examination of figures 25 and 26, orientation of the characters is of no significance; but one informant who was shown a copy of Damm's figure inverted the paper in order to read it.

It is evident, therefore, that the characters found by Brown in 1913 at Woleai were known there and elsewhere in the Central Carolines in 1909; and further, that Brown did not collect the complete set.[6]

In the Japanese literature on Micronesia available to us we have found only one reference to the writing, in spite of the long period of Japanese occupation, 1914 to 1945. This is by Someki (1936, p. 178, fig. 5; 1945, pp. 405, 476–477, and figs. 189, 230) who illustrates 38 characters of the same type (27 of them occurring among Brown's 51, 7 others which appear on lists furnished by our informants, and 4 which only Someki gives). They are not presented in any formal sequence; we have located them in various positions in column G of figure 25 by means of comparison of their graphic forms with characters in the other columns and by means of their attributed phonetic values, which, however, often deviate considerably from the values in the other columns. Someki states that the characters, which he apparently collected at Faraulep in 1934, occur only at Ifaluk, Elato, and Faraulep, and he illustrates a wooden bowl from Elato which bears a few of the characters. He derives some of the symbols, which he identifies as of Roman alphabetical origin, from an early European influence, and, like Imbelloni, speculates that the others are linked to Easter Island writing.

---

[5] Two informants have read this line for us, as follows (the numbers are those of the characters in figs. 25 and 26):

39/X/4/III/46/30/28/III/23/25/IV/III/ 11 /53/16/11/I/17
Wolipwe/ masturbate / he /and/ Foimeyat

It will be noted that, as in the samples of writing collected by ourselves, there is no separation of words or phrases and no punctuation. One of our informants, C., occasionally uses a tiny triangle or diamond between words at the level of the uppermost portion of the characters; its use is inconsistent, but it seems to be intended to terminate phrases and sentences.

[6] There is also to be noted the existence in 1909 of a set of numeral signs at Faraulep (Damm, 1938, pp. 213–216). Damm attributes their invention to a chief Saueru; he states that the symbols originated from tattoo designs and from signs taken from Japanese newspapers, and that their recency of invention was evident from their limitation to use in copra transactions. Since no other authority mentions them, and since no native of whom we inquired during 1954–57 knew anything of them, we will not discuss them further.

TYPE 2 SCRIPT

The Südsee Expedition volumes, while they fail to refer directly to the type of writing we have called Type 1, present a second set of characters of a very different type. From Ifaluk, Damm (1938, fig. 180) gives a list of 18 characters belonging to this second type and shows their phonetic values. Damm and Sarfert (1935, fig. 278) give almost the identical script from Satawal; it contains 19 characters of the same graphic form with nearly the same values as the Ifaluk characters, in slightly different sequence. These two lists are presented by the German anthropologists without comment or analysis, except that Damm attributes the introduction of this writing at Ifaluk to a castaway missionary from Truk. The symbols are reproduced here in columns B and C of figure 26, and are of the type of writing which the present authors will call Type 2. Not only are the symbols and their values different from Type 1 writing; they are clearly derived, as is evident upon simple inspection, from Roman characters, while the symbols of Type 1 in nearly all cases show no resemblence to Roman alphabetical characters.

These are the only two series of Type 2 that we have found in the published materials. But in the lines of writing from the Faraulep men's house, previously mentioned, there are also some symbols of Type 2. And in the three words which Brown appends to his Woleai list there are three characters which mystify him, since they do not occur in his list of 51 Type 1 characters, but which can be identified from the Ifaluk and Satawal series as belonging to Type 2. Besides this, all of the illustrated objects previously mentioned bear characters of this type in addition to the ones of Type 1, and there are additional illustrations of a Lamotrek house and a Puluwat canoe decorated in Type 2 characters only (fig. 26, cols. D–H). And in Someki's list there are 11 characters of this type (fig. 26, col. I).

We have, then, evidence that in 1909 both types of symbols were known at Woleai, Faraulep, Puluwat, and probably Satawal, if not elsewhere, and that at least Type 2 characters were known at Ifaluk and Lamotrek. In 1934, the date of Someki's visit, both systems were known at Ifaluk and Elato.

Explanatory notes for figure 26

Column

A. Numbers assigned to characters. Numbering after M.'s sequence (col. J).

B. Damm (1938, fig. 180). Sequence, characters, and attributed values. Ifaluk, 1909.

C. Damm and Sarfert (1935, fig. 278). Sequence, characters, and attributed values. Satawal, 1909.

D. Damm (1938, fig. 280). Characters from beams of men's house. Faraulep, 1909.

E. Damm and Sarfert (1935, fig. 128). Characters from tinderbox. Satawal or Puluwat, 1909.

F. Damm and Sarfert (1935, figs. 212, 272). Characters from canoe and flute. Puluwat, 1909.

G. Krämer (1937, pl. 9c). Characters from beams of men's house. Lamotrek, 1909.

H. Krämer (1937, pl. 15 and fig. 109). Characters from canoes and bamboo box. Woleai, 1909.

I. Someki (1936, fig. 5, p. 178; 1945, figs. 189, 230). Characters and attributed values. Presumably Faraulep, Ifaluk, and Elato, 1934.

J. M. of Pigue, Faraulep, 1954. Sequence, characters, and attributed values in Smith's orthography.

K. L. M. C. of Pigue, Faraulep: 1955A, 1955B, and 1956. Sequence, characters and attributed values; attributed values of column L in Smith's orthography.

N. O. P. R. of Ifaluk: 1955, 1957A, and 1957B. Sequence, characters and attributed values; attributed values of columns N and O in Smith's orthography.

Q. A. of Falalap, Woleai, 1957. Sequence, characters, and attributed values.

R. L. of Pigue, Faraulep, 1957. Characters and attributed values.

S. N. of Pigue, Faraulep, 1957. Characters and attributed values.

T. O. of Falalus, Woleai, 1957. Characters and attributed values.

U. P. of Eauripik, 1957. Sequence and characters.

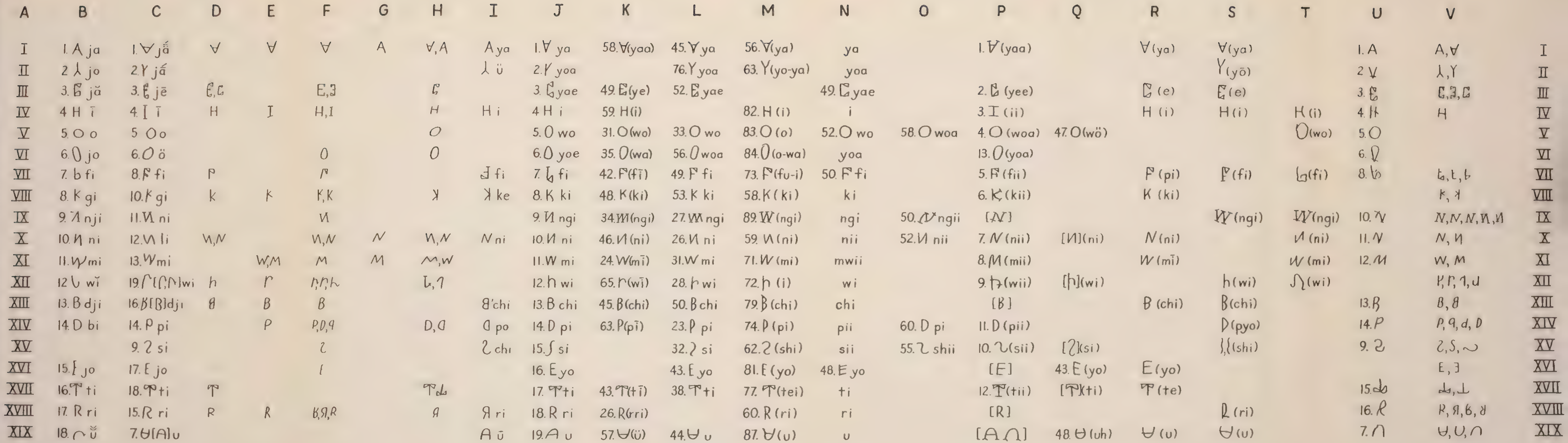
V. S. of Ifaluk, 1955. Characters.

REMARKS

1. Positions in sequence of column A assigned to characters in columns D–I, R, S, T, and V by comparison of form of character, and of value if given, with form and value of characters of the other columns.
2. Bracketed characters are those not given in informants' lists but occurring in word samples; or are variant forms from word samples.
3. Values in columns B, C, and I are as given by Damm, Damm and Sarfert, and Someki respectively. Attributed values in columns J, L, N, and O are based on hearing of tape recordings and are in Smith's orthography, except those in parentheses, which were heard under hurried field conditions. Those in column N were obtained from informant R. reading not his own list of characters but the list by informant M. (given in column J). Attributed values in columns K, P, Q, and T, in parentheses, not taped; are given as roughly recorded in the field. Attributed values in columns M, R, and S, in parentheses, not taped; values were written by these informants in Japanese *katakana,* and are here shown in the orthography used by Prof. Y. Uyehara of the University of Hawaii, who has transcribed the *katakana* characters for us.*
4. Numbers preceding characters in columns B, C, J, P, and U, form separate series, independent of any series of numbers in figure 25. Numbers preceding characters in columns K–O are in the same series as those preceding corresponding lists of characters in figure 25 by the same informants, since these informants gave lists containing characters of both types.

---

*See footnote following notes to figure 25.



	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	
	I	1. A ja	1. ∀ jā́	∀	∀	∀	A	∀, A	A ya	1. ∀ ya	58. ∀(yaa)	45. ∀ ya	56. ∀(ya)	ya		1. ∀(yaa)		∀(ya)	∀(ya)		1. A	A, ∀	I
	II	2 ⅄ jo	2. Y já						⅄ ü	2. Y yoa		76. Y yoa	63. Y(yo-ya)	yoa					Y(yō)		2 V	⅄, Y	II
	III	3. G jă	3. Ɛ jē	Ɛ, G		E, Ǝ		G		3. G yae	49. E(ye)	52. E yae		49. G yae		2. G (yee)		G (e)	E(e)		3. E	G, Ǝ, G	III
	IV	4 H ī	4. [ī	H	I	H, I		H	H i	4 H i	59. H(i)		82. H (i)	i		3. I (ii)		H (i)	H (i)	H (i)	4. H	H	IV
	V	5. O o	5 O o					O		5. O wo	31. O(wo)	33. O wo	83. O (o)	52. O wo	58. O woa	4. O (woa)	47. O(wö)			O(wo)	5. O		V
	VI	6. 0 jo	6. O ö			0		0		6. 0 yoe	35. 0(wa)	56. 0 woa	84. 0 (o-wa)	yoa		13. 0(yoa)					6. 0		VI
	VII	7. b fi	8. F fi	P		F			Ⅎ fi	7. b fi	42. F(fī)	49. F fi	73. F(fu-i)	50. F fi		5. F (fii)		F (pi)	F (fi)	b(fi)	8. b	b, t, b	VII
	VIII	8. K gi	10. K gi	k	K	K, K		ꓘ	ꓘ ke	8. K ki	48. K(ki)	53. K ki	58. K (ki)	ki		6. K (kii)		K (ki)				K, ꓘ	VIII
	IX	9. Λ nji	11. N ni			N				9. N ngi	34. W(ngi)	27. W ngi	89. W (ngi)	ngi	50. N ngii	[N]			W (ngi)	W(ngi)	10. V	N, N, N, N, N	IX
	X	10. N ni	12. V li	N, N		N, N	N	N, N	N ni	10. N ni	46. N(ni)	26. N ni	59. N (ni)	nii	52. N nii	7. N (nii)	[N](ni)	N (ni)		N (ni)	11. N	N, N	X
	XI	11. W mi	13. W mi		W, M	M	M	M, W		11. W mi	24. W(mī)	31. W mi	71. W (mi)	mwii		8. M (mii)		W (mī)		W (mi)	12. M	W, M	XI
	XII	12 ∪ wĭ	19. Γ [Γ, Γ] wi	h	Γ	Γ, Γ, h		L, 1		12. h wi	65. Γ(wī)	28. Ͱ wi	72. h (i)	wi		9. h (wii)	[h](wi)		h (wi)	ʃ(wi)		Ͱ, Γ, 1, d	XII
	XIII	13. B dji	16. B [B] dji	8	B	B			8'chi	13. B chi	45. B(chi)	50. B chi	79. B (chi)	chi		[B]		B (chi)	B(chi)		13. B	B, 8	XIII
	XIV	14. D bi	14. P pi		P	P, D, 9		D, Ɑ	Ɑ po	14. D pi	63. P(pī)	23. P pi	74. P (pi)	pii	60. D pi	11. D (pii)			D(pyo)		14. P	P, 9, d, D	XIV
	XV		9. ʔ si			ʔ			ʔ chi	15. ʃ si		32. ʔ si	62. ʔ (shi)	sii	55. ʔ shii	10. ʋ (sii)	[ʔ](si)		ʃ, ʃ (shi)		9. ʔ	ʔ, S, ~	XV
	XVI	15. [jo	17. E jo			[				16. E yo		43. E yo	81. E (yo)	48. E yo		[E]	43. E (yo)	E (yo)				E, Ǝ	XVI
	XVII	16. T ti	18. T ti	T				T, ⊥		17. T ti	43. T(tī)	38. T ti	77. T (tei)	ti		12. T (tii)	[T](ti)	T (te)			15. ⊥	⊥, ⊥	XVII
	XVIII	17. R ri	15. R ri	R	R	B, Я, R		Я	Я ri	18. R ri	26. R(ri)		60. R (ri)	ri		[R]			R (ri)		16. R	R, Я, B, ४	XVIII
	XIX	18. ⌒ ǚ	7. ∀ [A] u						A ū	19. A u	57. ∀(ü)	44. ∀ u	87. ∀ (u)	u		[A ∩]	48. ∀ (uh)	∀ (u)	∀ (u)		7. ∩	∀, U, ∩	XIX

FIGURE 26.—Type 2 symbols and values.

(For explanation, see opposite page.)

471762 O-60 (Face p. 278)

PRESENT-DAY KNOWLEDGE AND DISTRIBUTION OF THE WRITING

We were able, in 1954 to 1957, to obtain lists of symbols of one or both types from various living informants of Woleai, Faraulep, Lamotrek, Ifaluk, and Eauripik. These symbols are included in figures 25 and 26 under informants' names. In addition we have samples of the writing, though not lists of characters, from several other persons of all these atolls; and additional persons were able to read or at least to identify many of the characters. We also have samples from tattooing and from canoe-house beams (pls. 42–44).

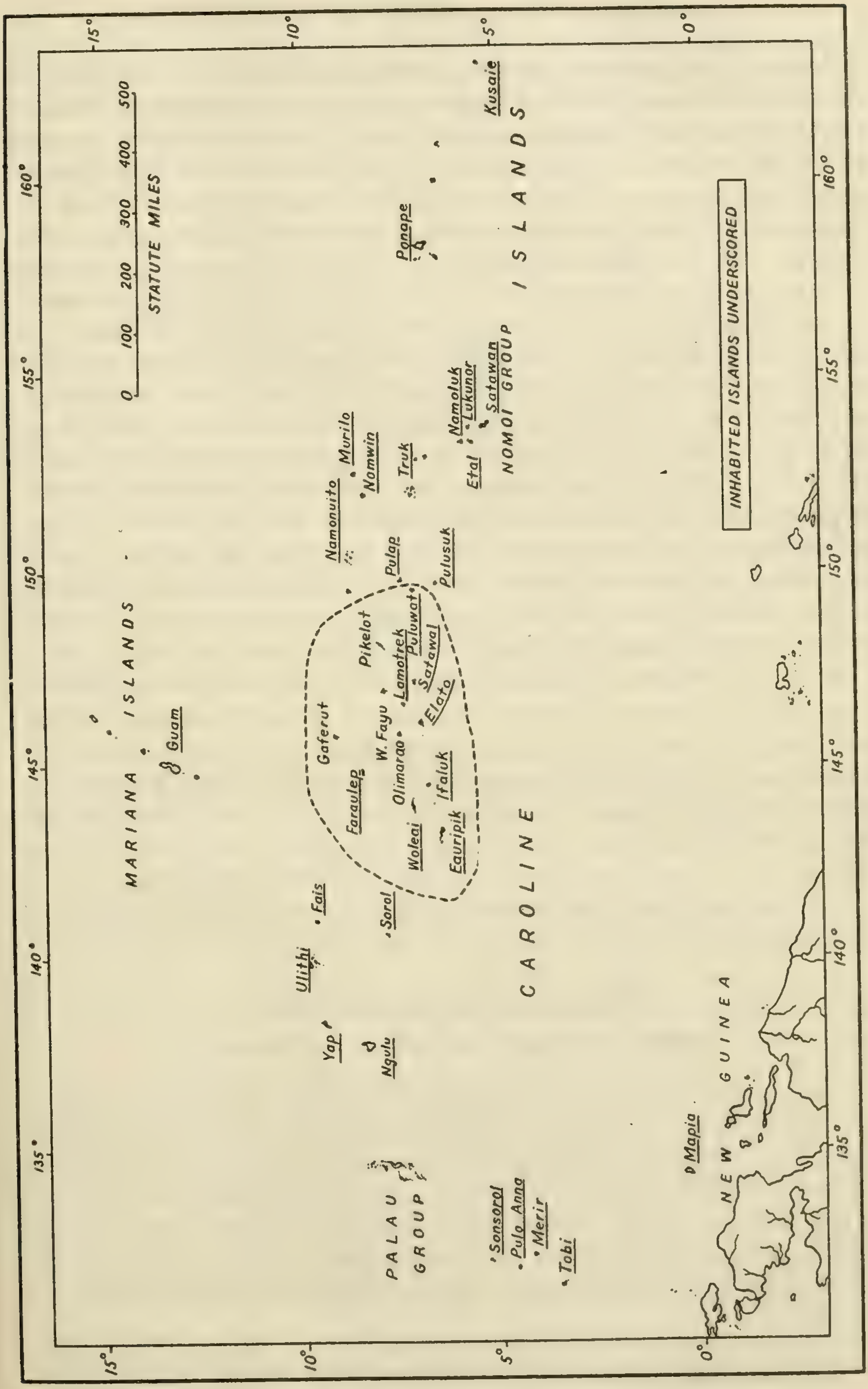
The number of people who today know the writing is not certain. At Faraulep two men and two women provided us with lists which included both types of characters (fig. 25, cols. H–M, and fig. 26, cols. J–M, R, S), and the two men wrote sample words and texts; another two men and two women (two of them of Woleai origin) were able to recognize from 14 to 38 Type 1 characters and 15 to 17 of those of Type 2; still another woman is said to know the writing; in this list of Faraulepese familiar with the system we should also reckon a tenth person, a man who died in 1955, but who the previous year had recognized 17 symbols of Type 2 and is said to have known the other type. As for the other atolls in the Woleais:

Woleai atoll: Two women of Falalap Island gave us Type 1 lists and wrote Type 2 characters in sample words (fig. 25, cols. R, S; fig. 26, col. Q); a Falalus man wrote a Type 2 list (fig. 26, col. T); a Wottagai woman and a Siliap man wrote some Type 2 characters and words; two Wottagai men could read symbols of Type 2; and we copied examples of writing in tattoo and on house beams and tinderboxes at Falalus and Wottagai (as we did also at Faraulep). *Eauripik:* One man wrote a Type 2 list (fig. 26, col. U), and another man recognized 16 of the Type 2 characters and wrote sample words; a third man, the last at this atoll who knew Type 1 writing, died recently. *Ifaluk:* One man wrote three lists containing both types (fig. 25, cols. N, O; fig. 26, cols. N–P) and a long text in characters of both types, as well as sample words; another man wrote a similar text (his characters are shown in fig. 25, col. T, and fig. 26, col. V); and a third man, who claimed to have once known the whole system, could read a large number of the characters. *Lamotrek:* A man of Ifaluk origin who learned the writing at Ifaluk by means of letters from Faraulep, gave us two Type 1 lists (fig. 25, cols. P, Q) and was able to read additional characters of both types; he also wrote sample words; a second man recited the lists orally; and a third could read many of the characters; and again there was writing on house beams. *Elato:* No one knew the system, although several persons bore tattooing in Type 2 characters done by a woman now dead, and we copied characters from house beams. *Satawal:* One man who died in 1955 had the previous year recognized some Type 2 characters; no one else literate in the writing could be found, although a Satawal woman who did tattooing in both types is still living at Palau, and at least four women (one of them from Woleai) were tattooed with the symbols; and writing on house beams, most of it dating from Japanese times, was once more recorded. As for Puluwat, east of the Woleais, though three informants knew the writing for what it was, they could read none of it and stated that the few people who had known it were dead. Altogether we have samples of writing and/or lists of characters from 27 living or recently deceased persons, as well as characters copied from tattooing and from beams and other objects. No doubt some of the people whom we tested only for reading ability can also write in the script.

It would appear, then, that the writing has or once had a geographical distribution from Eauripik in the west to Puluwat, 300 miles to the east, and was known on all the inhabited islands between. (See map 1.) Specific inquiry elsewhere in the Carolines established that it had not existed beyond these limits,[7] but it was often recognized for what it was; people on Pulusuk, for example, have heard of it as "writing of Faraulep." Within the area where it exists, not many persons seem ever to have known it, and knowledge of it is declining. While formerly there was some interest among younger people in learning the writing, many today use an adaptation of Japanese *katakana* writing instead, and the children are being taught to write in the English alphabet in Government schools. All of our informants were past their youth. Previously, when more people knew the system, it was used for writing letters to one another, often to request supplies of native and European commodities, but nowadays, with travel made easier and with stores available, this function of writing has lapsed. The few people who know the script today use it primarily to record chants and magical and medicinal formulae. One man says he learned the writing specifically in order to be able to record songs, medicines, and magic, which he keeps in a notebook. A recent convert to Catholicism keeps a notebook of catechism lessons in the writing. An Ifaluk man who, in late Japanese times, became lost at sea, states that during his misadventure he kept an account in the native writing which included the birds he saw "and their meaning." Lt. Kevin Carroll (tragically killed in Iran in 1957), who was an administrator in the military government at Yap in 1946, told us that he sometimes transmitted orders to the Central Carolines, through an Ifaluk amanuensis, in the native script.

---

[7] We have no information for Pulap, just east of the Woleais.


STATUTE MILES
0
100
200
300
400
500
MARIANA ISLANDS
Guam
CAROLINE ISLANDS
Kusaie
Ponape
NOMOI GROUP
Satawan
Lukunor
Namoluk
Etal
Murilo
Nomwin
Truk
Namonuito
Pulap
Pulusuk
Pikelot
Puluwat
Satawal
Lamotrek
Elato
W. Fayu
Gaferut
Olimarao
Faraulep
Ifaluk
Woleai
Eauripik
Fais
Sorol
Ulithi
Yap
Ngulu
PALAU GROUP
Sonsorol
Pulo Anna
Merir
Tobi
Mapia
NEW GUINEA
INHABITED ISLANDS UNDERSCORED
15°
10°
5°
0°
135°
140°
145°
150°
155°
160°

Map 1.—Area of the occurrence of the script.

NUMBER AND SEQUENCE OF CHARACTERS

From all the sources previously mentioned and from the lists of characters and samples of writing we ourselves have collected, we have a total of at least 78 characters of Type 1, to most of which we can assign phonetic values, and 19 of Type 2. We also know that there is a definite sequence. For Type 1, M.[8] of Faraulep gives a list of 42 characters identical in sequence with the first 42 of Brown's list from Woleai. Of the three lists obtained from C., one is identical in sequence as far as Brown's No. 21, one as far as No. 22, and the third to No. 50 (except for character 35, which is given as the 80th in C.'s list). Similarly, of R.'s two lists containing Type 1 characters, one coincides with Brown's as far as character 43 (with some omissions) and the other up to character 20 (with one omission) and again from 29 to 43. From T., one list (with two omissions) runs in the same order up to No. 18, and another list (with some omissions) to 47. B. gives a list which duplicates Brown's from 1 to 12, omits 13 to 38, but resumes at 39 and runs to Brown's 49. And the list by A. runs in Brown's sequence to No. 44 (with four omissions and with No. 28 out of order). The list from the Faraulep wooden board of 1909, with three omissions, also runs in the same sequence up to No. 32.

As for Type 2, only five lists are given in sequence separate from Type 1 (fig. 26, cols. B, C, J, P, U). It will be seen that four of them agree as far as No. VI. The Ifaluk list of 1909 and the Faraulep list of 1955 agree completely in sequence except for the omission of one character in the former. The Satawal list of 1909 and the Eauripik list of 1957 likewise are in agreement (not considering omissions) as far as No. XI, and both have No. XIX in seventh position.

It is evident, then, that we have here a system of writing which was well-defined some time before 1909.

ORIGIN OF THE WRITING

DISTINCTNESS OF THE TWO TYPES

What is the origin of the Carolinian writing? We may disregard the speculations of Brown, Diringer, Imbelloni, and Someki, since there is no evidence to support them and they border on the fantastic. In answering this question, it is important to note that of the five lists of characters we have obtained from published sources, two (Brown's Woleai list and the list from the wooden board found at Faraulep by Damm) contain only one type, the non-alphabetical type which we have called Type 1; two (the Ifaluk and Satawal lists published by Damm and by Damm and Sarfert) contain symbols which are all of Type 2; only one (Someki's), which appears to be in no formal sequence, has both types. In other words, the natives from whom the lists were obtained themselves consider the symbols to be of two types; we have not sorted them out on any logical grounds. Also, some of our informants gave us the two types in two separate sets. Other informants gave us mixed lists, but nevertheless distinguish the characters as belonging to two types of writing.

---

[8] Designations of informants referred to in this paper are as follows: A.: Marutang of Falalap, Woleai. B.: Nachomai of Falalap, Woleai. C.: Chiyemal of Pigue, Faraulep. L.: Laichib of Pigue, Faraulep. M.: Magilo of Pigue, Faraulep. N.: Nesawen of Pigue, Faraulep. O.: Maluchorang of Falalus, Woleai. P.: Fagolifek of Eauripik. R.: Maroligar of Ifaluk. S.: Tarof of Ifaluk. T.: Tachep of Lamotrek.

SIMILARITY OF TYPE 2 SCRIPT TO THE ALPHABET

When we first examined the symbols it was immediately apparent that those of Type 2 were taken without great alteration from Roman alphabetical symbols; they all appear to be modified forms of our own upper-case letters; whereas most of those of Type 1 bore little resemblance to the alphabet or, it seems evident from examination of the exhaustive compilation of other forms of writing illustrated by Diringer, to any other known system of writing. It therefore suggested itself to us that Type 2 was first introduced into these islands from some European source, and that, perhaps because it fitted poorly into the native phonetic patterns, another system, Type 1, was then devised in order to fill a need for more adequate representation.

SYLLABIC VALUES

It was apparent also that neither type of symbol was used alphabetically, except for symbols representing vowel sounds alone. The three words that Brown gives us indicate that both types were being used in 1913 to represent syllables, not single phones. The words and phrases we later obtained from our own informants verified our guess that this was in fact a syllabary, and suggested what the process of development had been. All the symbols, of both types, have names which are also their attributed phonetic values (although, as we shall see, in actual writing values are often only approximate). Except for characters representing vowels alone, nearly all of which belong to Type 2, they represent open syllables composed of an initial consonant or semivowel followed by a vowel. Further, every symbol of Type 2, excluding those representing vowels alone, has an attributed value whose vowel portion is a long *i*, while all symbols of Type 1, with two exceptions (Nos. 7 and 67) have as their vowel portions attributed values other than *i*. Writing is accomplished by a mixed alphabet-syllabary system; when a syllable consists of a vowel alone, the character for that vowel is used, as in alphabetical writing; when it is formed by a consonant-plus-vowel or semivowel-plus-vowel combination, the appropriate syllabic character, of either type, is used. (See table 2.)

TYPE 2 HISTORY RECONSTRUCTED

This evidence caused us to guess that a European alphabet or a modified form thereof had been introduced to these islands, but with names attached to the letters different from those we know them by; that the names for the consonantal letters consisted of the phonetic value of the consonant followed by an *i* suffix; that the natives did not understand the acrophonic principle upon which the names were based, hence did not attempt to write alphabetically but took these names as having syllabic value and tried to write their language with them;[9] and that they devised the other system of writing, Type 1, when they found the first system of syllabic representation, Type 2, inadequate to reproduce all the sounds of their language. This reconstruction of history seemed consistent with the consistently open form of the syllable in this language, syllable-final consonants commonly occurring only at the ends of words. Binary geminate sequences occur, but dissimilar consonants are almost always separated by at least an excrescent vowel. Among the 301 Woleai words that we have assembled from the text material in Smith (1951), written in his orthography, only three combinations seem to be exceptions, those italicized in the place names So/*w*/g, Ya/u/*rw*/pii/g, and Ya/nga/*lh*/ge/ra/i/lh. Thus, since the spoken language in large part is composed of open monosyllables, such a system of writing serves it well. When a spoken word has a terminal consonant, only the consonantal portion of the final character used in writing the word retains phonetic value, and the vowel portion which follows it becomes valueless.

POSSIBLE SOURCES

Where could the natives of these islands have obtained the Roman characters? Dates of discovery by Europeans range from 1686 for Faraulep to 1828 for Eauripik, but the natives were in intimate contact with other islands which had earlier contact with the West; Yap, for example, was discovered in 1526, and Fais in 1543. In the late 18th and early 19th centuries, visits by explorers and traders became fairly frequent, and a number of ship's deserters and castaways have left accounts of their stay in various of the Carolines. But missionaries failed to establish permanent stations in these islands until the end of the 19th century, and the natives remained in virtually aboriginal condition. The natives themselves were probably more active agents in culture dispersal in those days than were explorers, traders, or missionaries. They are skilled mariners and navigators, and possess a remarkable geographical knowledge. Much has been written of the navigational skill and exploratory zeal of the Polynesians, but the similar qualities of the Micronesians have remained in obscurity. According to Hornell (1936, p. 438), "In all the Micronesian groups of islands the design of the outrigger canoe reached a higher level of development than in any part of Polynesia, as did also the knowledge of the science of navigation possessed by certain of the islanders." Meinicke (1876, p. 374) likewise refers to the natives of the Carolines and Marshalls as the foremost mariners of the Pacific, far surpassing the Polynesians in this respect, and Krämer compares Micronesian and Polynesian geographical knowledge with similar advantage to the former. In earlier days a flotilla of canoes from the Central Carolines assembled each April at Gaferut[10] and made the 300-mile trip thence to Guam in the Marianas in 8 days; canoes from Woleai, Faraulep, Lamotrek, Elato, Satawal, Puluwat, and possibly Pulusuk and Namonuito participated in this expedition; they traded shells, mats, cordage, and canoes for iron knives, beads, and cloth, and made the return voyage in May or June. Guam, be it noted, had been missionized by the Spanish beginning in 1668. This commerce, apparently interrupted by the Spanish conquest of the Marianas, was resumed in 1788 and persisted until 1873. Kittlitz (1858) encountered Caroline natives in 1827, e. g., at Faraulep, who already spoke fluent Spanish, an ability no doubt acquired on visits to Guam. Objects of Marianas origin were traded farther east than the islands directly involved in the commerce, e. g., to Truk and Namoluk (Finsch, 1900, p. 48; Girschner, 1912–13, p. 180), which got their iron tools and tobacco from Puluwat. Lütke (1835, p. 295) found cats on Lukunor (in the Nomoi group), known by the Spanish name "gato," which, no doubt, were obtained from the Marianas via such native traders.

---

[9] For examples of writing in 1909 with exclusively Type 2 characters, see Damm and Sarfert (1935, p. 277).

A permanent colony of Carolinians grew up in the Marianas after 1815, with settlements at Guam and Saipan, and later at Tinian. These colonists, who numbered many hundreds, came, and continued until recent years to come, from the very islands we are here concerned with, as well as from others which lack the writing; visits back and forth to their home islands were frequent; much trading involving European manufactures occurred.

There was also contact with the Spanish in the Philippines. The Spaniards at Guam employed Caroline crews to take them as far as the Philippines. The journal of the Salem ship *Clay*, Capt. W. R. Driver, reports finding in the Fijis in 1827 two natives of the Carolines left there by a Manila brig 5 years before; these men signed on the *Clay* as crew members and returned to Manila. Traditions of seafarers cast away in the Philippines and successfully returned home are known as far east as Puluwat. The first knowledge of the Woleais comes from Spanish accounts of 30 canoeloads of people from these islands driven ashore at Mindanao and elsewhere in 1664, and the literature contains many more such reports in later years, including the most recent case in 1954. Many of these castaways made their way home, either by themselves or aboard foreign vessels.

---

[10] Not West Fayu, as is often stated in the older literature on the subject.

Another point of contact with the outside world was by way of Yap, whose dominion over all the Central Carolines has been described by several writers,[11] and continues in diminished degree until today; formerly it extended farther east than the islands we are concerned with here, and contacts with Europeans would have been possible at both ends of the area involved. Mission activities at Yap, to be sure, did not commence until 1886, but traders were active there earlier in the century.

Finally, maps drawn by natives of these islands and sailing directions which they are capable of giving reveal knowledge of places in the Philippines, parts of Indonesia, the northern fringe of Melanesia, and some of the islands of the Gilberts and Polynesia.

Nevertheless, none of the foregoing gives us any clear indication that some early contact with the West or with literate natives from other regions resulted in familiarity with writing among Central Carolinians. We have only one report of writing from this area before the German expedition's visit in 1909: Arago (1822, p. 35) reproduces a letter from a Satawal chief written in response to the order of a trader at Rota in the Marianas; the writing used in this letter is purely pictographic, the chief having made drawings of the objects he desired in return for the shells which he had for barter, and there is not the slightest resemblance to the system of writing we are here concerned with. Nor is this system reported by Chamisso, Choris, Dumont d'Urville, Freycinet, Kittlitz, Kotzebue, Lesson, or Lütke, all astute observers, in the early 19th century, and it is not likely that it would have escaped the attention of Christian, Finsch, or Kubary in the latter part of that century if it had existed then.

It seemed to us therefore that the writing must be of more recent origin. Also it appeared that the most likely place to look for its source was in the islands to the east of the area concerned. To the west and north are Palau and the Marianas, whose inhabitants speak Indonesian languages, and Yap, whose language, although it is usually classified as Micronesian, is very different from the languages of the Central Carolines. The borrowing of Roman characters from these islands, even though some of the natives of the Woleais speak Yapese, would for these reasons have been difficult. But more important, alphabetical writing was introducted to the Marianas, Palau, and Yap by the Spanish, and the letters of the alphabet, as given orally by the natives of those islands today, all have modified Spanish names, very different from the names in the Central Carolines of the Type 2 characters which we have considered to be of alphabetical derivation.

---

[11] See Lessa, 1950.

LINGUISTIC AFFILIATIONS

The language of the Central Carolines belongs to a larger linguistic group which has a geographical range stretching from Ulithi in the west nearly to Truk and Nomoi (or the Mortlocks) in the east, and includes also the islands south of Palau. This area has four subdivisions: in the west, Ulithi, Fais, and Sorol; to the southwest, Sonsorol, Pulo Anna, Merir, Tobi, and probably Mapia; to the east, Pulap, Pulusuk, and Puluwat; and in the center, all the inhabited islands of the group commonly referred to as the Woleais: Faraulep, Eauripik, Lamotrek, Elato, Ifaluk, Satawal, as well as Woleai atoll itself. The Woleais, together with Puluwat, constitute the area where the writing is known. The languages of these four subdivisions are mutually intelligible, differing only in some phonemic shifts and in some minor vocabulary changes. Farther east, the inhabitants of Truk and of the islands to the north and south of Truk, including the Nomoi group, speak dialects of another language, whose relationship to the first language group is close but not sufficiently so to permit mutual intelligibility. However the two vocabularies offer a great number of cognates and the phonemic patterns are not remarkably different (Smith, 1951).

THE ALPHABET OF TRUK

In the first language area there has not been, until the time of the American administration, beginning after World War II, any literature in the native tongue. But in the second area there has been, since 1878, a series of Bibles, hymn books, catechisms, arithmetic instruction books, and so on. These are all in the Nomoi dialect, and were all written by the missionary Logan, who was assigned this task by the American Board of Commissioners for Foreign Missions.[12] The books are used not only in the Nomoi group but in all of the Truk area without accommodation to dialect difference. They are printed in ordinary roman characters, some of them also using a number of diacritical devices.[13]

---

[12] Available to us are the following, all by the missionary Logan:
Maku en Mark. 1880 and 1882 editions. Honolulu.
Kapas fel, puk eu, kapas en lom kana, Mortlok. 1880. Honolulu.
Nor an lamalam kana; kapas an Mortlok (Mortlock Island Hymns). 1881. Cincinnati.
Puk an afalafal, kapas an Mortlok. 1881. Honolulu.
Testament Sefa an amam Samol o Ran amanau Jisos Kraist. 1883 (1st edition) and 1944 (7th edition). New York.
Kapas fel, puk eu: kapas en Kot, Mortlok. 1884. New York.
Aritmatik. 1887. Honolulu.
Puk an ais fel, me ais an lamalam kana (Mortlock catechism). 1888. Honolulu.
Puk an kël, me kël an lamalam kana, lan kapas an Ruk me Mortlok. 1888 (2d ed.), Honolulu; and n. d. (3d ed.), San Francisco.

Trukese today, who write alphabetically and who still use the Logan Bible unaltered from its 19th century form, when asked to recite their alphabet nearly all respond with the following sequence: A E I O U F S K L M N *N* P R *R* T.[14] These are the very same characters that are used in three of Logan's books, except that Logan also uses a J. (J is used on Truk by the older generation, almost solely for writing biblical names.) Also one of the Logan books (*Puk an afalafal*, 1881, p. 1) contains, apparently for instructional purposes, almost the same sequence: A E I O U F J K L M N *N* P R *R* S T. In oral recitation, the vowels have approximately Spanish values, and the consonants which follow are given as though suffixed by *i*, thus: fi, si, ki, li, mi, ni, ngi, pi, ri, chi, ti. That is, the names of the Trukese consonants are the same as the names and phonetic values of the Type 2 syllabic characters of the Woleais.[15] There are only five vowels as against the eight in the Type 2 lists, and the sequence of characters is slightly different—we will shortly attempt to explain these differences—but the relationship would seem to be obvious. The Truk area would seem, then, to be the source of the Type 2 writing of the Central Carolines. Moreover, inasmuch as Logan began his work in 1878, Type 2 writing must have come into use since that date.

ALFRED SNELLING AND THE TRUKESE CASTAWAYS

How did the Trukese alphabet get to the Woleais? No American Board missionary was ever stationed there, but the Ifaluk informants of Damm told him that a missionary from Truk, who was en route from Ulul (in Namonuito atoll) to Truk in a sailing canoe, together with a number of Trukese, was driven ashore at Eauripik at some unspecified time; there he remained until a Woleai chief arrived and invited him to accompany him back to Woleai; the Trukese already knew how to write and taught the art to their hosts at Eauripik and Woleai; the account goes on to say that the Trukese went back to Truk via Ifaluk and Lamotrek and taught writing to the inhabitants of these atolls too. To this account is to be added that of Burrows and Spiro (1953, p. 201), who say that writing "came to Ifaluk from Woleai, where it was taught by a missionary." (Burrows gives no further information about the writing.)

---

[13] Logan's books all contain the following roman characters; A, E, I, O, U, F, J, K, L, M, N, P, R, S, T. Three have in addition *N* and *R*. Three others have *N*, *R*, *A*, and *O*. The 1888 catechism has all of these characters, plus an umlaut E. The second edition of the hymn book published in 1888 has all of these characters again, as well as diacritical devices—accent, two forms of circumflex, and umlaut—for A, E, I, and O, which also have italicized forms. The 3d edition of the same hymn book (n. d., but published before 1899) converts all of these forms to italicization. After 1900 the only nonstandard orthographic devices are italicized N, R, A, and O.

[14] The Spanish, before 1900, introduced their own alphabet, which has never caught on, one reason being that two of the consonants, as pronounced by the Spanish, form words with vulgar meaning.

[15] The alphabets of Ponape and Kusaie, in the Eastern Carolines, and of the Marshall Islands are similar; that is, they are given with the vowels, pronounced with Spanish values, first, then the consonants which again all have names with *i* endings. Apparently this regularization of consonantal names was the standard pedagogical device of the American Board of Commissioners for Foreign Missions missionaries. These islands, however, have languages with phonemic systems different from those with which we are concerned in this paper, a fact reflected in the local alphabets; thus the missionaries did not introduce F at Ponape, where there is no corresponding phoneme, but did introduce both D and T. These alphabets, therefore, could not be the source of the Type 2 writing.

One of our informants, a man of Eauripik, confirmed the foregoing in the following words: "An American Protestant missionary from Truk got lost on a boat during German times (1900–1914). He stayed there (Eauripik) and taught the people (how to write) . . . . His name was Misinining. He was there only for three or four months and left for Falalap (in Woleai) where he soon died." Another Eauripik man refers to this missionary as Misililing and remembers that he and the Trukese all gave instruction in writing.

All of these accounts, of course, must refer to the writing we have called Type 2, since the castaway party from Truk must have used for instruction the alphabet known to them, and we have seen that the alphabet is the inspiration of Type 2 writing.

The mention of a missionary called "Misinining" sent us to the records of the American Board of Commissioners for Foreign Missions, where we found that a Rev. Alfred Snelling was missionary to Truk beginning in 1888, and that he was lost at sea in a native boat in 1905 (Bliss, 1906, pp. 129, 162; American Board of Commissioners for Foreign Missions, Annual Reports, 1886 to 1906). The equation of Mr. Snelling and "Misinining" is obvious. Damm (1938, p. 133) and Krämer (1937, p. 203), in context unrelated to anything bearing on the script, also refer to Snelling. Damm relates only that Snelling sailed in a native canoe for 93 days until he reached Eauripik, whence he went to Woleai. Krämer gives the story in greater detail, telling how Snelling, en route from Puluwat and Ulul to Truk, went astray and drifted for 3 months until he reached Eauripik, whence a boat crew from Woleai fetched him to their island, where he died.

None of these published accounts which mention Snelling say anything about his role in the introduction of writing. However, Mr. Frank Mahony, presently District Anthropologist at Truk, has established the connection in the following interview with a Trukese named Airas. The story of Snelling is well known at Truk, but Airas, who was a student at Snelling's school in 1900, and who made the ill-fated voyage with him, is apparently the last survivor of that journey. Mahony relates:

> Snelling left Tötiw [Tarik] Island [in Truk atoll] intending to go to Ulul and Piserach [both in Namonuito atoll]. He picked up the chiefs of Puluwat and Ulul on Etten [in Truk atoll], then went to Tol [in Truk atoll] to get Sirom and Kinion

[two men]. Snelling took 400 baskets of preserved breadfruit with him to give to . . . Piserach and Ulul. They left Truk and went to Piserach, thence to Ulul, then back to Piserach. They left Piserach around 2:00 PM to make the return journey to Truk. . . . Ten hours later . . . they were still not out of sight of Piserach. . . . At 3:00 AM a light breeze blew up . . . While Snelling slept some passengers they had picked up on Ulul . . . talked the crew into changing course. . . . From then on they searched in vain for Truk. They had a little copra and some drinking coconuts aboard. . . . At the end of seventeen days this was all gone. They managed to catch a few fish. They were at sea about ninety days until finally they got to Eauripik. Meanwhile . . . four of them had . . . died of starvation. The people of Eauripik took very good care of them. . . . When a big chief of Woleai named Okupeniar [Krämer gives his name as Agupelior] came they went with him to Woleai . . . [The three Japanese living there] took Snelling into their house. . . . Snelling knew he was going to die and asked to be moved . . . to the men's house . . . and in twenty-four hours he was dead. . . . After a few months Airas and the others left Woleai and went to Lamotrek. . . . Then they went on to Satawal and on to Puluwat . . . then after a couple of weeks . . . back to Truk.

Mahony:

Did you hold school on the islands?

Airas:

No, we[16] just taught them to write. . . . They didn't know how before. . . . We taught (the Trukese alphabet) to the people of Eauripik and Woleai . . . but not to the people of Satawal, Puluwat, and Lamotrek. . . . We didn't stay long enough on these islands, and besides they already knew how to write. On Lamotrek the Guamanian wife of the white trader had taught the people how to write. . . . The people of Satawal probably learned from Lamotrek.

ADOPTION OF THE TRUKESE CHARACTERS

Airas recalls the following alphabet as used by himself and the other Trukese instructors: A E I O Õ U F S K L M N Ñ P R Ř J T. It differs from the modern Trukese alphabet only in having two extra letters, Õ and J. Of these letters, all six vowels occur in the Type 2 writing of today, where the vowels A, E, I, and O are to be found in positions I, III, IV, and V, and where U occurs in different positions on different islands (see fig. 26). The fifth character in Airas' series, Õ, is no doubt the sixth in the various versions of Type 2 writing and is to be equated with the italic O of some of the Nomoi books of Logan. As for the other two vowels in Type 2 writing, one of them, the second in all the series, is very likely the italic A of most of the Nomoi books, and the E-like character, No. XVI, is possibly derived from the italic E which we have found in three of those books (though we later suggest a possible Japanese *katakana* derivation.) Airas' failure to include these two letters in his series may very well be due to a fault of memory; 50 years have passed since his adventure, during which time the Trukese alphabet has become standardized in the version given on page 288, so that Airas may be influenced by modern writing, which tends to omit italics.

---

[16] For the record, we should mention the names of the other Trukese teachers, who, with Airas, carried on their instruction, using pencil and paper as well as writing in the sand. They are Kinion, Sirom, Uneitor, and Resapechik.

All the consonantal names in the alphabet given by Airas are pronounced by him with *i* endings. Identification of most of them with the Type 2 characters is readily apparent upon inspection and need not be discussed. A few Type 2 characters have been altered in orientation (as Nos. IV and XI) or in minor detail (as Nos. VIII, X, XIII, and XIV).[17] Only the Type 2 symbol representing the sound *wi* (No. XII) is at all puzzling. Possibly it is the letter J, which occurs in all the Nomoi printed books, where it is used interchangeably with S; it occurs also in Airas' alphabet, where, like S, it has the name *si*. J is disappearing in modern Trukese writing because of this equivalence with S, but its former position is shown by its replacement by S between F and K. Now if J was indeed among the letters taught to the people of Eauripik and Woleai, as Airas states, its obvious superfluity may have resulted in its being used in Type 2 writing to represent a sound for which no symbol was available but which was felt to be required, namely *wi;* the position of character XII at the very end of the Satawal list (see fig. 26), as though it was tacked on after this transformation was effected, suggests this explanation.[18]

The only letter in both the Trukese alphabet and in Airas' list which does not appear in Type 2 writing is L. In the Nomois, where Logan worked out the alphabet used in all the printed materials of the Truk area, *l* and *n* are both phonemes, as they are also, apparently, in all of the low islands around Truk. But at Truk itself there is no *l* phoneme, only *n*, and L is used in writing when necessity is felt to defer to traditional spellings based on the Nomoi Bible, the Bible used at Truk. Now at Woleai atoll there are four corresponding phonemes, which Smith (1951) writes *l*, *lh*, *n*, and *nh* (the *h* indicating a release). These phonemic distinctions are probably made also in the speech of most of the other Woleais. Yet in the writing no necessity is apparently felt to make the same distinctions; we shall see that this holds true for the characters of Type 1 also, that is, those characters whose syllabic values contain these four consonants, suffixed with vowel sounds other than *i*. If L was among the letters taught by Airas and his companions, it had dropped out of use as a Type 2 character between 1905, the date of Snelling's drift voyage, and 1909, when the Südsee Expedition collected Type 2 lists at Satawal and Ifaluk. However, in the various Type 1 series there is an L-like character at position 33, whose value Brown gives as *la* and the consensus of our informants makes to be *ne* or *nae*. We may guess that the Trukese castaways introduced L and N as equivalent in name, because of the Trukese phonemic pattern, and that L was therefore converted into a Type 1 symbol whose value was rather similar; one of our informants, C., actually states that character 33 was indeed so derived.

---

[17] Thanks to Mr. Mahony, an old man of Murilo (an atoll north of Truk) has furnished us with examples of the alphabetical characters used in the Truk area about 50 years ago, apparently as the missionaries taught them. There are some differences in form of the characters when they are compared with the Type 2 writing of today in the Woleais, but at least his E, *N*, and T bear the same peculiar embellishments as the corresponding Woleai characters (see fig. 26), so it would appear that the alteration from the graphic form of Roman upper-case characters did not occur in the Woleais but in the Truk area.

[18] Airas would seem to have transposed J and S in position in his series. However, a Nomoi man who went to Snelling's school at Truk from 1897 to 1901 gives the final letter of the alphabet as he learned it as J, so possibly Snelling's party introduced it to the Woleais in this position. Modern samples of tattooing collected by Mr. Mahony at Puluwat contain a J-like character which is read as *wi*, not *si*.

Airas' account is that the Trukese castaways taught the alphabet as they knew it only to the natives of Eauripik and Woleai; that the Guamanian woman at Lamotrek had already taught the people of that island to write; that Satawal probably got its writing from Lamotrek; and that by then the people of Puluwat also knew how to write. However, it is hardly possible that the Satawal writing of Type 2, recorded in 1909, would have had the consonant-plus-*i* value pattern, as it did, if it were of Guamanian origin. Guam uses a standard Roman alphabet, whose letters have Spanish names, while the Satawal characters of Type 2 are in form, name, and value completely in the Woleai pattern. Moreover, the form, name, and value of the Lamotrek characters obtained in 1955, as well as the form of the Lamotrek and Puluwat characters of 1909 painted and incised on the various objects, previously mentioned, are all of the same pattern. As for the Guamanian woman, a Lamotrek informant who in 1905 would have been about 18 years old denies that she taught anyone to write. Either Airas' memory is at fault or whatever Guamanian influences may have been present in 1905 had disappeared by 1909. If missionaries had previously visited Puluwat, as Snelling did the islands north of Truk in the course of his missionary work, or if natives of Puluwat attended the missionary school at Truk, it is possible that there may have been a separate introduction of the alphabet there; there do seem to have been native missionaries from Truk at Puluwat from time to time. This might explain Airas' statement that the people of Puluwat already knew how to write. Examples of relatively recent tattooing collected by Mr. Mahony from islands all around Truk, including Puluwat, are done in upper-case alphabetical characters, many of which show the peculiarities of the Type 2 characters we have recorded from the Woleais (e. g., the triangular embellishments on the cross strokes of the E, T, and other letters); these may stem from a separate influence from Truk.

In this connection, it will be noted (see fig. 26) that the two Type 2 lists of 1909 are in rather different sequence. The Ifaluk list (col. B) of 1909, however, is identical to the Faraulep list (col. J) of 1954, except for omission of No. XV, and R.'s partial list (col. P) of 1957 agrees in having No. VI out of order and Nos. XIV and XV reversed. On the other hand, the Satawal list (col. C) of 1909 is in fairly close agreement with the Eauripik list (col. U) of 1957, as well as with the present-day Trukese alphabet and with the alphabet Airas says he taught at Eauripik and Woleai in 1905; all of them have U (No. XIX) following italic O (No. VI), then F (VIII), S (XV), and, except for one of these lists, K (VIII); and P (XIV) is followed by R (XVIII) and italic R (XIII) except on the Eauripik list. This would possibly suggest that there were two separate introductions of the alphabet, each in a different sequence; but then it must be assumed that in each case the same development followed, that is, the names of the letters were both times taken as their phonetic values and the letters converted into a syllabary. More likely the alphabet introduced in 1905 at Eauripik and Woleai was similar in sequence to Airas' list as he gave it 50 years later, and as it diffused among the Central Carolinians a second tradition developed which became fixed by 1909, as seen by the persistence of the Ifaluk sequence of 1909 until 1954 at Faraulep.

It is also of interest at this point to note a similar development in Type 1 writing. Characters 24, 25, and 28, occurring in identical positions in the lists of Brown (Woleai) and of M. and C. (both of Pigue, Faraulep), are either missing entirely or are out of sequence in both of the lists of R. (Ifaluk) and in those of T. (Lamotrek) and A. (Woleai), as well as on the Faraulep wooden board found by Damm in 1909. Also, T.'s list and R.'s lists place No. 52 directly after No. 47. It would therefore seem that at least two slightly different sequences in Type 1 writing already existed in 1913 (the date of Brown's visit), and that this difference has persisted until today. This is probably what R. has in mind when he states that there are two different systems, one which developed at Faraulep Island, the other at Pigue Island (both in Faraulep atoll), and that further changes have occurred in the course of teaching the writing to other people. Though we have no specific information as to inventors of new characters, it seems obvious that there have been many since the first invention was made; the variability in the different lists after the first 50 characters (see fig. 25) attests to such development.

SPREAD OF TYPE 2 WRITING

We do not have a great deal of information about the spread of Type 2 writing after the introduction of the alphabet by Snelling and his party, and what we have is sometimes conflicting. According to

Damm the Trukese castaways taught writing to the people of Eauripik, Woleai, Ifaluk, and Lamotrek. A Eauripik man, Maninifek, states that Snelling himself gave the instruction to the people of Eauripik. P. of Eauripik, who attended some of the lessons, recalls that both Snelling and the Trukese were the teachers. Informants at Woleai, Ifaluk, Lamotrek, and Satawal state that the castaway party stopped for brief periods of time at those islands on their return journey to Truk, but gave instruction only at Woleai. Lamotrek informants also say that they learned from one Reghipol, who returned to Lamotrek from Woleai about 2 months after a typhoon which we date as having occurred in March, 1907; he had learned to write at Woleai, undoubtedly in Type 2. But two women of Woleai, A. and B., say Type 2 writing came to Woleai from Lamotrek; this can hardly be correct, since we know that the alphabet, from which Type 2 writing sprang, was taught at Woleai by Snelling. C. and Tereso of Pigue, Faraulep, say that their atoll got its Type 2 writing from Lamotrek also. And Burrows (1953) reports that the Ifaluk (Type 2?) writing came from Woleai. These are the only statements we have as to the dispersal of the Type 2 script from its presumable Eauripik-Woleai center.

TYPE 1 HISTORY

We have already stated our conclusions that the Type 2 writing comprises, apart from its eight vowels, a syllabary consisting of symbols which are all of consonant-plus-*i* phonetic value, that these values are the same as the names of the alphabetical characters taught by a castaway Trukese party in 1905, those characters having become converted into a syllabary as the result of their names being taken as having syllabic value. The Type 1 writing was developed through stimulus diffusion after a period of trial with Type 2 alone, when the inadequacy of the latter was recognized (a Woleai woman makes this statement in virtually the same words); it consists, with a very few exceptions, of characters whose values are all consonants suffixed by vowels other than *i*.

There are some examples of attempts at an early stage in the development of the writing to set down words with the use of Type 2 characters exclusively (Damm and Sarfert, 1935, p. 277). Thus u/li/ge/t is written with characters XIX/X/VIII/XVII, bo/da/u with XIV/XVII/XIX, ja/li/gi/o/m with I/X/VIII/III/XI, etc. We also have examples in tattooing and from modern informants who know only Type 2 writing. B., who knows both types and who writes her name as 1/20/21/16, gives as an alternative form X/XIII/XI/IV, all in Type 2. A., writing the island name Sa/taa/wa/l, writes it as 37/25/14/33, but gives alternatively XV/XVII/XII/X. Obviously the modern method of writing, which uses characters of both types, is much more precise than Type 2 alone.

INVENTION AT FARAULEP

Informants from all the islands agree that Type 1 writing was invented at Faraulep, and the script is generally called *ishilh Foeshavlap* (writing of Faraulep). Even people who cannot read the writing, as far east as Puluwat, at once identify it by this name. Three informants (two Ifaluk, one Lamotrek) state that they learned Type 1 writing at Ifaluk from Faraulep visitors; another Ifaluk man says he learned it at Ifaluk from a man of Woleai origin who had long been a resident of Faraulep. Several Woleai people also give Faraulep as the place from which Woleai got its writing; three Woleai women learned the system at Faraulep, two of them shortly after the 1907 typhoon. Three Puluwat people, none of whom can read the script, say that Puluwat obtained it from a canoeload of Ifaluk voyagers. At Satawal a Faraulep man is said to have taught the Type 1 writing, which no one at this atoll now can read. There also appears to have been some instruction among various Central Carolinians when they worked together during Japanese times at the phosphate mines at Angaur, in the Palau group. We have several statements to the effect that the system was learned through exchange of letters between various of the islands.[19] We have no other clues as to dispersal of the Type 1 writing.

Several informants give the names of the inventors, all of whom were residents of Faraulep.[20] Though the lists of names differ, there is considerable agreement among them. The claim by Faraulep natives that the Type 1 writing was invented at Faraulep, the support for this claim by natives of other islands who state that they learned the writing at Faraulep or from Faraulep visitors, and the universal appellation of the writing, even among people who cannot read it, as *ishilh Foeshavlap,* leave us satisfied that the invention was made at Faraulep and was largely, if not entirely, the work of a group of Faraulep natives.

---

[19] These letters were originally written on wooden boards or on coconut-leaf midribs. Nowadays, letters written on paper are exchanged.

[20] Lists of inventors, as given by different informants, follow. We attempt to equate names of inventors in the different lists by preceding them with numbers.

Hafeleliyal
1. Sagiyelimar
Hafiliyalo

Malang
1. Sagiyelimar

Lügetal
Taiyor
2. Seghuuri
Marotiuw
3. Igemor
4. Tairui
Wilimar
5. Yairong
Rafiteg
Uchilimar
Ghilibwe
Wolibwe

4. Tairu
Gafilelimar
Yatelagh
2. Seghui
Soghorub

Mathiyolong
Pierong
3. Igemor
Iletuobul

5. Yairong
Tarop
2. Saigouwe
4. Tairuiwe

All of these alleged inventors are now dead, except the person whose name is last on the fifth list; she is a Woleai woman who has lived at Faraulep since before the invention, but she herself does not claim to be one of the inventors. The Lamotrek man referred to above states he learned the Type 1 script from a Faraulep man named Sagawi who came to Ifaluk when he was there; this is probably the person identified by No. 2. One of the Ifaluk men learned the script from the two men in the second list, who came to Ifaluk from Faraulep. And a Woleai woman who learned to write at Faraulep had as her teachers the four men in the sixth list.

FOREIGN INFLUENCE

We are less satisfied about the possibility of alien influence. The Südsee Expedition reports state that at various times between 1900 and 1910 there was a copra station at Faraulep to which several Japanese seem to have been attached. One informant from Eauripik states that the Type 1 script was made at Faraulep by a Japanese named Soshaki or Soshiki, and that a Filipino named Serifino or Serbino may have helped. A Faraulep man states that the Faraulep people themselves invented the writing but were later helped by a Japanese and a Filipino. At Woleai a woman of that atoll, who learned the writing at Faraulep and who gives the names of four Faraulepese as the inventors, states that the Japanese helped by contributing two characters, Nos. XVI of Type 2 and 61 of Type 1, from Japanese *katakana;* these two characters do actually nearly coincide with two Japanese characters in both graphic form and phonetic value. A Woleai man living at Faraulep since shortly after the invention insists that the Japanese Soshiki definitely did not help, and a Woleai woman who has lived at Faraulep since before the invention (and who is named by others as one of the inventors) denies that the Filipino was involved. All other informants state simply that the Faraulep people whose names they give were the inventors. We examined the possibility of Filipino influence, remote though it might be; but none of the symbols of any of the Filipino scripts can be related to the Woleai symbols (see Gardner, 1943; Diringer, 1948; Conklin, 1953). We also point out that two characters in addition to Nos. XVI and 61 are similar in appearance to Japanese characters; these are No. 26, which resembles the Japanese *kanji* form for "sun," and No. 34, which is like the Japanese *kanji* form for "wood" or "tree"; together, with the addition of one stroke to character 34, they would stand for "Nippon," and undoubtedly Japanese goods labeled thus were available to or seen by these islanders. However, in neither case is the phonetic value of the symbol similar to the Japanese value, so no more than the graphic form could have been borrowed. Also, in the case of character 26, informants have identified it as a representation of a canoe outrigger platform, as will be seen. The evidence for Japanese influence goes no further, although it is possible that the facts that *katakana* is a syllabary and that Soshiki may have been consulted by the inventors may have reinforced the idea of creating a syllabary, first stimulated through the names of letters of the Trukese alphabet having been taken as being their phonetic values.

DATE OF INVENTION

As for the date of the invention of Type 1 writing, native informants state that it occurred "after the big typhoon," when the German administration had to evacuate many distressed people to islands in the same area less hard hit, as well as to Yap, Palau, and Saipan. This typhoon can be no other than the one that struck these islands March 27–30, 1907; other typhoons of which there is record are either too early or too late. Now the Südsee Expedition ethnologists worked in all the islands we are concerned with during November and December of 1909, and found the writing as far east of Faraulep as Puluwat. The invention must therefore have occurred between these dates, and would probably have been closer to 1907 than to 1909 to have had time to spread so far by 1909.

DERIVATION OF CHARACTERS

The form of the characters and their values suggest several possibilities concerning their derivation, apart from the four which may be linked with Japanese characters. Some of the Type 1 symbols appear to be modified forms of the alphabetical signs of Type 2. Thus character 3 is apparently an altered T, with the value changed from *ti* to *ta*. Using the same criteria of resemblance in form and value, character 8 would be derived from R, 11 from M, 12 from *N*, 33 from L, 40 from S, 48 from *N*, and 66 from F.

Other characters, as their graphic forms show, are attempts to represent natural or artificial objects, and the values of these characters are also the same as or close to the names of such objects. These constitute a kind of rebus writing. Among such characters we may list the following identifications made by informants:

5. Sprouting coconut
9. Bird's wing
13. Ulcer, boil
14. Canoe (represented under sail)
16. Forked branch used for hand net and flying-fish net
19. Portion of bonito
26. Canoe outrigger platform
28. Fish backbone
29. Trigger fish
30. Perfume bottle
31. Woman's breast

32. Midrib of coconut palm leaf (showing leaflets to either side)
35. Saw
36. Coconut palm tree
41. Porpoise
43. Lure of bonito hook
45. Leaf
53. Leaf of *Hibiscus tiliaceus*
56. Fishhook (modern type)
60. Canoe seat
64. A plant bearing this name

Nos. 29 and 41 have the same graphic form and the same names as conventionalized tattooing elements, and may have been taken directly from tattoo design rather than from the animals they represent. No. 24 also may be a tattooing design.

Some other proposed identifications, made not by informants but by the authors, using the same criteria of similarity in form and name, are:

2. Tattooing-rake handle
10. Composite bonito hook
15. Mast
38. Cock's tail feather
42. Ear ornament consisting of two interlocking rings
44. Fingernail

Brown also suggests that No. 12 is "bamboo" and No. 37 is "knife," but the resemblances in these cases strike us as elusive.

The fact that the characters are so frequently of rebus type may indicate that the inventors became preoccupied for a time with this principle of representation during their development of the system, and that some of the gaps in our identifications might be filled by further research in the vocabulary of material culture. It is of interest also that the phonetic value of the Type 2 character *N* (No. IX) is also the native word for "tooth," which the form of the character resembles, especially in the variant form given by C. Perhaps it was this coincidence which first suggested the rebus principle.

Of the other characters, some may well have been borrowed from decorative design elements, but we have not recognized any except those already described. Most of the others are very likely the product of pure imagination. Indeed, this must needs be the case, for Carolinian dialects in these islands are extremely deficient in words consisting of open monosyllables, upon which the syllabary is based, and even more so in such words which can be concretely represented.

We should note that Brown's list, but none of our lists, includes several symbols (Nos. 14, 31, and 43) whose attributed values are shown as closed monosyllables. It is possible that he misheard the sounds: certainly the word for canoe (No. 14) is *wa*, not *warr* as Brown writes it, in the Central Carolines as far east as Truk; it becomes *war* only beyond Truk, at Ponape. Similarly the name of the bonito hook lure (No. 43) has no final consonant as Brown gives it. The female breast (No. 31) is indeed *tüt*, as Brown has it (*tuut* in Smith's orthography), just as the trigger fish (No. 29) is properly *pup*, but in the syllabary No. 31 becomes *tü* (*tuu*) and No. 29 becomes *pu*, in our lists; the words for these objects seem to be compounded forms of older roots (Goodenough, 1953, p. 16, and personal communication), and these compounds are apparently sufficiently transparent to the natives to allow isolation of the open syllables for the purpose of including them in the syllabary. Possibly this was done because of paucity of open monosyllabic words in the language. A similar process may have resulted in the discarding of final consonants of still other words which may have been utilized for the syllabary, but which we have not been able to identify in such altered form as belonging to the rebus type.

ANALYSIS OF THE WRITING

PHONEMES, PHONEMIC COMBINATIONS, AND CHARACTERS

We wish now to examine the actual writing and its adequacy to represent the language.

According to Smith (1951) the Woleai language has 50 phonemes. There are 11 vowels which occur both long and short, 2 vowels occurring only short, the semivowels *w* and *y*, and 24 consonants. For these phonemes Smith has developed an orthography in roman letters whose official adoption has been proposed to the Trust Territory administration; we will use it in the remainder of this study, as we have done in the figures and tables.[21]

---

[21] Smith's published work is nontechnical in language, and his phonemes were established by means of minimal pairs. The values indicated below are, in Smith's words, "only a meager approximation indeed." For this reason we are not satisfied that our transcription in his orthography of the attributed values of the various characters in figs. 25 and 26 is always accurate. His description of the orthography, which is adapted for use without diacritical marks, is as follows:

a	f*a*ther
ah	f*a*-ther
aa	f*a*t
aah	f*a*-t
ae	f*e*d
aeh	f*e*-d
e	fath*e*r
ee	s*a*fe
eeh	s*a*-fe
i	s*ea*
ih	s*ea*-
ii	s*i*t
o	*oa*k
oh	*oa*-k
oa	*o*ff
oah	*o*-ff
oe	hors d'*oe*vres
oeh	hors d'*oe*-vres
u	boot
uh	boo-t
uu	N*ü*rnberg
uuh	N*ü*-rnberg
v	(like "oe" but with tip of tongue curved up and back)
vh	
w	*w*ood
y	*y*es

b	u*pw*ard
c	*j*uice
ch	*ch*oose
d	ba*d*
f	aloo*f*
g	Bac*h*
j	(a strong "h")
k	*k*id
l	bott*l*e (Brooklynese)
lh	ba*ll*e (French)
m	so*m*e
mw	so*mew*ay
n	ma*n*
nh	ma*n*ikin
ng	si*ng*
ngh	si*ng*er
p	u*p*
r	"B*r*itish" (trill "r")
rw	I*rw*in (trill "r")
s	*s*ow
sh	*sh*ow
t	pa*t*
th	pi*t*-e-pat
z	adze
Hyphen (-)	used for on-glides or excrescent vowels in reduplicatives.

From Brown, Damm, Sarfert, and Someki, and from our various informants we have a total of 97 characters (78 of Type 1 and 19 of Type 2) which are used to write the Woleai language. All of these characters, except those which represent vowels alone, have syllabic values of the consonant-plus-vowel or semivowel-plus-vowel pattern.

Smith's phonemic analysis would indicate that there is a theoretical possibility of 624 such syllables (24 consonants and 2 semivowels combined with 24 vowels); with the addition of the 24 vowels when these form independent syllables, there might be altogether 648 symbols.

Of course, it is most unlikely that all 624 combinations actually occur in the language. We have assembled from Smith's text materials a list of 301 Woleai words written in his orthography, and in table 1 the frequency of occurrence of all syllables among these 301 words is shown. There actually occur only 162 syllables of the consonant-plus-vowel and semivowel-plus-vowel types, as well as 13 syllables composed of independent vowels, a total of 175. It is striking that the phonemes *d* and *ngh* do not appear to occur in syllable-initial position at all, but in these 301 words occur only terminally. Some of the columns headed by other consonants (e. g., *ch, j, n, rw, th, z*) have only one or two entries under them. More than 175 different syllables must, of course, occur in the language. Our informants have written for us 222 of the 301 words (see table 2), have failed to use 21 of the symbols (VI, 7, 9, 24, 30, 44, 54, 55, 57, 61, 63, 64, 69, 70, 71, 72, 73, 75, 76, 77, 78), and use 3 of them only as terminal consonants (5, 47, and 52). Presumably the attributed values of these symbols are not the same as those of any other symbols, so failure to use them would mean that the appropriate syllables do not occur in these particular words but may very well occur in others. Even so, it is unlikely that more than, say, 250 or 300 syllables actually occur in Woleai speech. In the first 50 words (not counting repetitions) of Smith's text there occur 62 different syllables; in the next 50 words 29 more syllables occur; in the next 50, 18 others; in the 222 words written for us by our informants, there are altogether 157 different syllables; and in the total of 301 words taken from Smith, only 18 more or a total of 175. (These 18, which we do not have written in the native script, are: *bvh, fe, kii, loe, loeh, lhii, me, mwah, rah, ree, soe, shii, waah, waeh, wo, yaa, yaah, yoe,* in Smith's orthography.) If a curve is projected on the basis of these figures, it appears to flatten out at something under 250 syllables in 750 or 800 words.

LENGTH OF VOWEL NOT DISTINGUISHED

We may reduce still further the possible number of syllables in the writing. The distinction between long and short vowels does not seem to be utilized. We are not certain of the phonetic values of some of the symbols, but when we analyze words which informants have written for us we are seldom confronted by any two characters which seem to be distinguishable only on the basis of difference in vowel length; rather, when a native writes the characters for two syllables which contain the same consonant and whose vowel suffixes are identical except for being short in the one case and long in the other, he almost always uses the same character to represent both. The following examples (see table 4), in Smith's orthography, show this to be true (in each case *h* following the vowel indicates length):

Syllable	*Character used (and number of times so used)*
i	IV (44), III (1)
ih	IV (6)
u	XIX (11), XIX+39 (2)
uh	XIX (2)
uu	16 (4), IV (4)
uuh	16 (2)
v	16 (6), IV (1)
vh	16 (1), XIX+14 (1)
bu	29 (5), 59 (3), 13 (1)
buh	29 (1)
fa	32 (40), 66 (1)
fah	32 (2)
ga	46 (29), 50 (4), 74 (3)
gah	46 (2)
gi	VIII (26), VIII+III (1)
gih	VIII (2)
la	1 (24), 6 (1), 33 (1)
lah	1 (3)
li	X (5)
lih	X (2), 36 (1)
lha	1 (3), 33 (3)
lhah	1 (4)
ma	23 (9), 21 (1), 11 (2)
mah	23 (7), 21 (1)
maa	23 (12), 11 (1)
maah	23 (7)
mae	11 (24), 19 (2), 23 (1), 34 (2)
maeh	11 (2), 21 (1), 23 (1)
pa	43 (29), 26 (1)
pah	43 (1)
pi	XIV (5), XIV+III (2)
pih	XIV (7), XIV+III (1)
roe	35 (2)
roeh	35 (1)
sa	37 (7)
sah	37 (1)
see	40 (2), 40+IV (3)
seeh	40+IV (3)
shi	XIII (15), XIII+III (1), XV (1)

Syllable	*Character used (and number of times so used)*
shih	XIII (2)
shv	28 (1), 28+16 (1)
shvh	28 (1), 40 (1)
ta	3 (18), 18 (1), 25 (2)
tah	3 (13)
to	17 (22)
toh	17 (2)
tuu	31 (5), 31+16 (1)
tuuh	31 (1), 31+16 (1)
ya	I (50), III (1), IV+III (1)
yah	I (3)
yoa	XVI (1)
yoah	XVI (2), I (1), II (1)

It will be noted that, by and large, the frequency of occurrence of long vowels is much lower than that of short vowels. Perhaps for this reason the natives of the Woleais have found it unnecessary to invent characters which make the distinction.

Instead of 648 theoretically possible combinations, we have then only 338 (24 consonants and 2 semivowels combined with only 13 vowels), and 13 vowels which can occur not in combination.

VOWEL CHARACTERS

Of the 97 characters that we have found, a number have only vowel values; just how many is not certain. In table 1 it will be seen that of the 24 (both long and short) vowel phonemes in the Woleai language, only 13 actually occur as independent syllables in the sample of 301 words. Possibly if we had more than 301 words, more of the 24 vowels would appear. The other 11 vowel phonemes occur only in syllabic combinations. Of this 13, 4 are long vowels and in all words that informants have written for us they are represented by the same characters that stand for their short forms. This would leave 9 vowel phonemes for which characters would seem to be needed.

Now among our total of 97 characters there are some 13 which may or may not be intended to stand for vowels: I, II, III, IV, V, VI, XII, XVI, XIX, 14, 16, 39, and 72. (Possibly No. 74 should be included among them.) In the 222 words written by our informants (see table 2), only 3 of these 13 characters never represent semivowel-plus-vowel syllables (although they may have semivowel values when used terminally). Thus character IV usually represents the phoneme *i*, and also occurs as *ee*, *ih*, *ih+a*, *ih+y*, *uu*, *v*, and *-y;* it never appears in a written word in the form semivowel-plus-vowel. Similarly XIX is always *u*, *uh*, or *-w;* and 16 is always *uu*, *uuh*, *v*, *vh*, *i+-w*, or *-y*. Four others of the 13 characters may occur either as vowels alone or with semivowel-plus-vowel values: thus character I can be *a*, but also *ya, yah, yae,* or *yoah;* III is *ae, ee,* or *i,* but also *ya, yae, ye* and *-y;* XVI is *oa,* but also *yoa, yoah,* and *yoeh;* and 39 is *o* once, otherwise *wa, waa, wae, we, woe, -w.* Four other characters of these 13 appear only with semivowel-plus-vowel values: II is *yoah* in its lone occurrence; V is *we, woa,* or *yoeh;* XII occurs in our examples only as *wih;* and 14 is *wa, wae,* or *woa.* We have no examples of words containing characters VI or 72. (See tables 2 and 3.)

It is apparent that there is considerable variation in vowel value in these characters, as there must needs be if they are to represent all 13 (or 24, if we consider length) vowel phonemes when these phonemes do not enter into syllabic combinations with consonants and semivowels. If we eliminate the 4 characters among the 13 that seem to occur only with prefixed semivowel values and if we disregard characters VI and 72, which do not occur in our 222 written words, we have left just 7 characters which may be used to represent the 9 (or 13, if we consider length) vowel phonemes which actually occur as independent syllables in the 301 words taken from Smith (table 1).

It is likely that additional samples of writing from more informants would clarify matters; it is possible that all 13 of these characters may be read indifferently as simple vowels or with initial *w-* or *y-*. But from the evidence at hand, if we do not consider the three characters (IV, XIX, and 16) which do not seem ever to have the value of semivowel-plus-vowel, and ignoring for the time being variation in vowel value of the others among the 13 characters, there remain 94 characters out of the total of 97 to represent all of the possible syllabic combinations. It is obvious that the system is inadequate for truly phonemic representation, and that many of the 94 characters must serve for several combinations.

LACK OF EXACT CORRESPONDENCE OF CHARACTERS AND SYLLABLES

This conclusion is further borne out when we examine the range in value of the various characters as they are actually used in the writing. We have seen how wide this range is for the 13 characters we have just discussed. Table 3 lists all the syllables occurring among the 222 words which we have been able to obtain in the native script, arranged according to the conventional numerical sequence of figures 25 and 26. We see that character 4, for example, is used for at least 6 different syllables—*ba, baah, bae, be, bee,* and *boe;* character 33 is used for 11—*la, lae, le, lee, lii, lha, lhae, lhe, lhi, nhae, nhe;* character 50 serves for the syllables *ga, gae, ge, ka, ke,* and *kee;* etc.

But not only must one symbol serve for several different syllables. It is apparent that the same syllable may be represented by different symbols. Table 4, which lists in alphabetical order all the syllables which occur in the 222 words, illustrates this point; for example, the syllable *lhi* is written by one native with character 33 three times, character X 25 times, X+33 once, and X+IV once, and by a second native with X three times and 33+X once; similarly *pu* is written with characters 10, 13, or 59; *sha* with 18, 20, or 37; etc.

These two phenomena—the use of one symbol for several syllables, and the representation of one syllable by several symbols—explain in part the facts that the name or attributed value of a symbol, as seen in the various lists in figures 25 and 26, sometimes differs, and that in the writing of words the attributed value occurs only part of the time as the actual phonemic shape of the syllable the symbol is intended to represent. It would appear that when it is necessary to represent a sound which differs from the attributed value of any character, a choice may be made among two or more characters whose attributed values are close phonologically. For example, we have not recorded *tv* as the attributed value of any one character (it is possible, of course, that we have misheard some of the tape-recorded values), but in writing the word fa/*tv*/lh one native uses 32/31/33 and a second uses 32/XVII/33; symbol 31 is otherwise used by the first man for *tu* and *tuu*, and XVII by the second man for *ti* and *tii*. It would seem that each man has chosen, to represent the syllable *tv*, for which neither seems to know a character which has this as its attributed value, a character with an attributed vowel value on either side of it in articulation.

EFFECT OF DIALECTS

Some of the differences in choice of character by different natives may be due to dialect difference, but we have no way of assessing its effect, since such differences as may exist have not been determined. The only statements that Smith (1951) makes on this point are as follows (p. 40): "Islanders . . . may have difficulty in deciding on 'a' or 'aa' depending on their island of origin. These are separate phonemes on Weleeya (Woleai) and Foeshavlap (Faraulep) but perhaps not on Yaurwpiig (Eauripik). This is of course independent of the fact that some words are pronounced slightly differently on different islands"; and (p. 27): "On Eauripik 'tafeey' is pronounced 'tafee' and 'maaht' is pronounced 'maeht.' " (R. of Ifaluk apparently hears *ta/fee/y*, not *ta/fee*, for he writes the word with three characters: 3/66/III; and he distinguishes *maah/t*, which he writes 23/25 or 23/17, from *maeh/t*, 21/40.) The occasional use by various informants of two, or even three, characters for what, in Smith's orthography, should be a single syllable, would also suggest dialect differences not recorded by Smith; thus, in the following examples of syllables written by

Smith as consonant-plus-*ee* or consonant-plus-*eeh*, the informants write an extra character, namely IV, apparently for an additional vowel:

bee/yae	R.: *4+IV*/III
kee/i	R.: *50+IV*/III
li/*mee*/g	R.: X/*11+IV*/50
rwee/g	R.: *47+39+IV*/50
see/g	R., C., and M.: *40+IV*/50
seeh/gi	R., C., and M.: *40+IV*/VIII

REPRESENTATION OF FINAL CONSONANTS

The choice of a character to represent a final consonant seems to be much more capricious than the choice of a character to represent a full syllable. We have already pointed out that the attributed value of a character loses it vowel portion when the character is used for the terminal consonant of a word. In table 4 it will be seen how wide a choice of character seems to be permissible for such use. Nevertheless, some regularities are discernible. For example, 18 words terminating in -*g* are listed in that table, some of them written several times and by as many as three natives; for the -*g* the informants have without exception used character VIII in four words, in four other words they agree on character 2, in another five words they all use character 41, and they invariably write character 50 in five more. How are we to explain such consistencies in usage, sporadic though they are? In some Malayo-Polynesian languages there occurs a final vowel that is so weakly pronounced as to seem inaudible. While this phenomenon does not appear to be a feature of Woleai speech today, it may well have been so in the past; and if we may credit the inventors of the Type 1 script with ability to reconstruct the ancient *pu* from modern *pup* and *tuu* from *tuut,* as previously described, it is possible that in these instances the character chosen to represent -*g* is the one whose full syllabic value includes the vowel sound which was formerly terminal.

In the use of final characters in some words there is a hint that perhaps the informants are anticipating a vowel which would appear only when additional syllables were suffixed to the same words. Thus we have character 33 for -*lh* in the word mwae/*lh,* and also for *lhe* in the compound mwae/*lh*e/we; 33 is used again in mi/si/*lh* and in the compound mi/si/*lhae*/lh; but in the word rae/*lh,* informants use for -*lh* either 33 or X, as though this word might be compounded in different ways, and in the one compound form which we have in native script, rae/*lhi,* the syllable *lhi* is written with the character X.

Occasionally the vowel preceding the final consonant seems to influence the choice of character for that consonant. Thus -*l* is almost always written with character 33, occasionally with X; but character

36, which is used for the syllable *luu* in the word Fa/la/*luu*/s and for *lv* in the word fae/*lv*/w, also represents *-l* in the words vh/*l* (as written by one informant out of two) and uuh/*l* (by both of two informants); in other words, 36 seems to be the choice in these instances because the vowels of the preceding syllables are similar to the vowel portion of that character's full syllabic value. Again, character 2, which usually has the value *go* (see table 3), is used terminally as *-g* only in the words yae/lo/*g*, So/w/*g*, to/*g*, and toh/*g* (but not in sho/*g*), that is, in words where the preceding vowel is *o*. And the only times character 31 is used terminally are in the words tuu/*t* and tuuh/*t*, character 31 otherwise having the value *tu*, *tuu*, *tuuh*, or *tv*; in practically all other cases of *-t* informants agree in the use of character 25.

However, the principle which seems to develop from the foregoing does not seem to apply to many of the other terminal consonants. In some cases it would seem that it is the consonant, not the vowel, of the preceding syllable that determines which character is to be used for the final consonant of a word. Thus all informants use character 6 for the *-n* of bu/*n* and *-nh* of bu/*nh*, but use 33 or 36 for the *-nh* of pu/*nh*. Again, both C. and R. agree on character 12 for *-ngh* in tah/*ngh*, but 52 for *-ngh* in lhah/*ngh*; all informants use IX for *-ng* in cha/*ng*, lah/*ng*, and tah/*ng*, and all of them use 52 for *-ng* in lhah/*ng* and u/*ng*; they agree again on XIII for the *-c* in wih/*c* and on 5 for the *-c* in mwoa/*c*-mwoa/*c*; and there are further cases of such unanimity in choice of character to be used for final consonants. Perhaps there is some component of the phoneme which determines such seemingly arbitrary choice.

There is also some evidence, although not so strong, that sometimes the reverse occurs; that is, that the final consonant may determine which character is to be used for the preceding syllable. For example, R. and C. use character 47 consistently for final *r* or *rw*. In the words *sorw*, *raesorw*, *galiisorw*, and *josoar* the syllable preceding *-r* and *-rw* is written with character 68. The only other time 68 is used is for the syllable *sho* in the word jo/*sho*/s; whereas for *sho* in the word *sho*/g character 45 is used. How is this to be explained? It would seem that R. has misunderstood the word *joshos* and taken the final consonant, *-s*, as *-r* or *-rw*, since he writes 47 for it, instead of XV or 62 as he does for all other cases of *-s*. It therefore suggests itself that there is some kind of relationship between these two characters, 47 and 68, and that the use of the former requires the use of the latter.

Whether such relationships are of a functional nature, whether the system of spelling has in the course of years of use become arbitrarily conventionalized, or whether some aesthetic judgment is applied which prevents or encourages the juxtaposition of certain characters, is a matter that we are unable to settle. In many cases, perhaps in most cases, there seems to be no clear rule; rather it may be whim which often dictates which of several final characters is to be used. Nevertheless, examination of table 4 gives the impression that some rules are operative.

COMPARISON OF NATIVE TEXTS

The foregoing analysis is, of course, based entirely on examination of the 222 words in Smith's orthography that we have been able to get natives to write in the Caroline script. Smith's text, which is addressed to the natives and which consists of a guide to his proposed system of spelling, is naturally limited by his vocabulary and mode of expression. (See fig. 27.) But we have available to us two other texts, of native composition, by R. and S.,[22] both of Ifaluk (fig. 28). They have not been tape-recorded or put into Smith's orthography, but they will enable us to discuss frequency of occurrence of the symbols. S. uses 68 characters out of the 97, a total of 1,178 times; R. uses 65, a total of 483 times. Of the symbols (fig. 25, cols. N and O; fig. 26, cols. N–P) given by R. separately from the text, 10 do not occur in the text; and occurring in the text but not in the lists are 6 symbols. In other words, he knows 75 of the 97 characters, but in writing he makes use of only 65, of which 3 are the apparently simple vowels (IV, XIX, 16), so that he limits himself to 62 characters representing syllabic combinations for the 624 possible combinations. Of these, 11 are used only once, 8 only twice, and 10 only three times.

We have no comparable list of symbols and attributed values from S. with which to compare his text. He does not use in the text 29 of the symbols known to us; 22 of these 29 are also absent from R.'s text, and 10 are among those apparently unknown to R. Of the 65 which he uses, 10 occur only once, 4 twice, and 7 three times.

Percentagewise, some comparisons between the two men are of interest, assuming that we have adequate samples of this universe, speaking statistically. Character 7, not used at all by R., occurs with a frequency of 4.4 percent of the 1,178 characters written by S. Character 46 occurs in R.'s text with a frequency of 0.2 percent, but S. uses it 28 times as often, with a frequency of 5.6 percent. The respective figures for R. and S. for character 35 are 2.1 percent and 6.0 percent; for 50, 6.0 percent and 3.4 percent; for 39, 3.9 percent and 1.9 percent. There is less significance in the difference in occurrence of other characters.

Evidently, then, the system is flexible enough to permit of considerable freedom in expression of preference through employment of one character or another. In order of descending frequency, the

---

[22] S. is the man described by Spiro (1950) as a psychopath. He is kept confined at Ifaluk in a coconut log hut. Whether this fact diminishes the value of the comparison between his writing and that of R. we are not prepared to state.

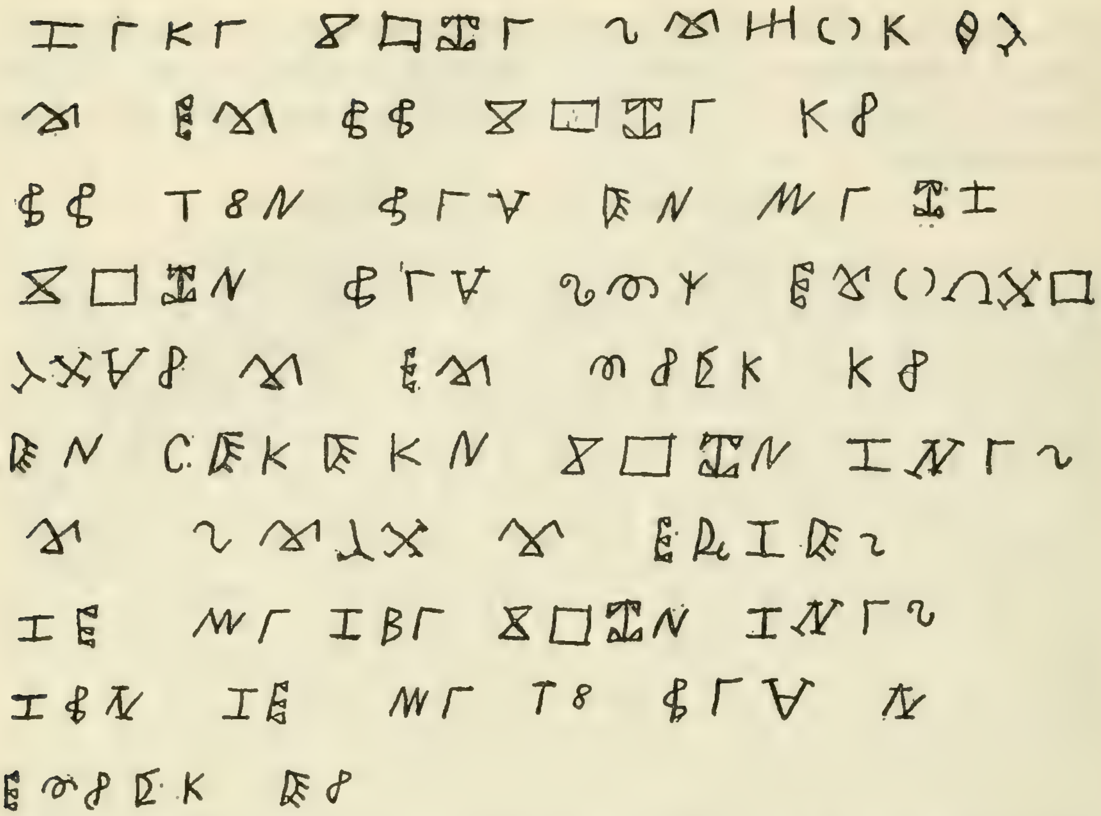


FIGURE 27.—Paragraph from Smith's roman text (1951, pp. 3–4) as written in native script by R. of Ifaluk. (Words are shown separated by spaces for purposes of clarity; in the original they run continuously.)

(For explanation, see opposite page.)

preferences of the two men for their most frequently used characters are:

	R. *Percent*		S. *Percent*
X	7. 0	IV	8. 0
50	6. 0	X	6. 6
III	5. 8	35	6. 0
IV	5. 4	46	5. 6
25	4. 7	7	4. 4
33	4. 7	33	4. 2

In a single person's writing, however, there is considerable consistency. Part of R.'s text is written twice. The duplicated portion contains 187 characters in both versions, which are identical except for the following changes in spelling in the second version: substitution of IV for 16 in one word; 37 for 40 in another word; 38 for 17 in a third; 6 for 33; the sequence III–50 for IV–46; and the sequence 6–52 for 1–2 in still other words. We are probably dealing here again with combinations of phonemes whose values lie within a range of overlap between values associated with two different characters, so that one choice is as good as the other.

EXPLANATION OF FIGURE 27

Characters used in figure 27 shown by numbers assigned to them (refer to figures 25 and 26). Text and translation as given by Smith (1951, pp. 3–4, 33).

IV 33 VIII 33   46 26 3 33   XV 4   32 17 VIII   45 41
i /lha/ gi/ l   ka/pe/ta/ l   si /bae   fa/to/ gi   sho/ g

4   III 4   39 39   46 26 3 33   VIII 20
bae   yae/be   wae-wae   ka/pe/ta/ l   gi /sh

39 39 ?   2 42 X   39 33 I   35 X   11 33   3 IV
wae-wae/lh   go/zv/lhi   we/lee/ya   rae/lh   mae/lae   ta/ i

46 26 3 X   39 33 I   40 23 36   III 4   17 XIX 1 26
ka/pe/ta/ l   we/lee/ya   si /mii/ lh   yae/be   to/ u /la/ p

41 1   I 20   4   III 4   23 20 15 VIII   VIII 20
gv/la   ya/sh   bae   yae/be   ma/sha/ra/ g   gi /sh

35 X   50 35 VIII 35 VIII X   46 26 3 X   IV IX 33 XV
rae/lh   ge/ra/ gi /roe/ gi /lhi   ka/pe/ta/ l   i /nge/lii/ s

4   XV 4 41 1   4   III 14 IV 35 XV
bae   si /bae/gv/la   bae   yae/wa/ v /rii/ s

IV III   11 33   IV XIII 33   46 26 3 X   IV IX 33 XV
ih / y   mae/lhae   i / shi /lh   ka/pe/ta/ l   i /nge/lii/ s

IV 39 12   IV III   11 33   2 42 ?   39 33 I   12
i /woe/ngoe   ih/ y   mae/lhae   go/zv/lh   we/lee/ya   nge

III   23 20 15 VIII   35 20
yae   ma/sha/ra/ g   roeh/sh

Ilhagil kapetal sibae fatogi, shog bae yaebe wae-wae kapetal. Gish wae-waelh
All words written in this way are written just as they sound. We spell Woleai

gozvlhi Weleeya, raelh maelae tai kapetal Weleeya. Simiilh yaebe toulap gvla
sounds, not Woleai words. Therefore Woleai has a

yash, bae yaebe masharag gish, raelh geragiroegilhi kapetal Ingeliis bae sibaegvla.
much better and easier way of spelling than English has.

Bae yaewavriis ihy maelhae ishilh kapetal Ingeliis, iwoengoe ihy maelhae gozvlh
It is difficult to spell the words of English but it is easy to spell the sounds

Weleeya, nge yae masharag roehsh.
of Woleai.

SUMMARY

In 1905 an American missionary from Truk, Alfred Snelling, and a party of Trukese were cast ashore at Eauripik. Here they gave instruction in writing with the alphabet which had been developed in the Nomoi Islands. The natives of Eauripik took the names of the letters as being their syllabic values and converted the alphabet into a syllabary. These letters constitute the symbols we have called

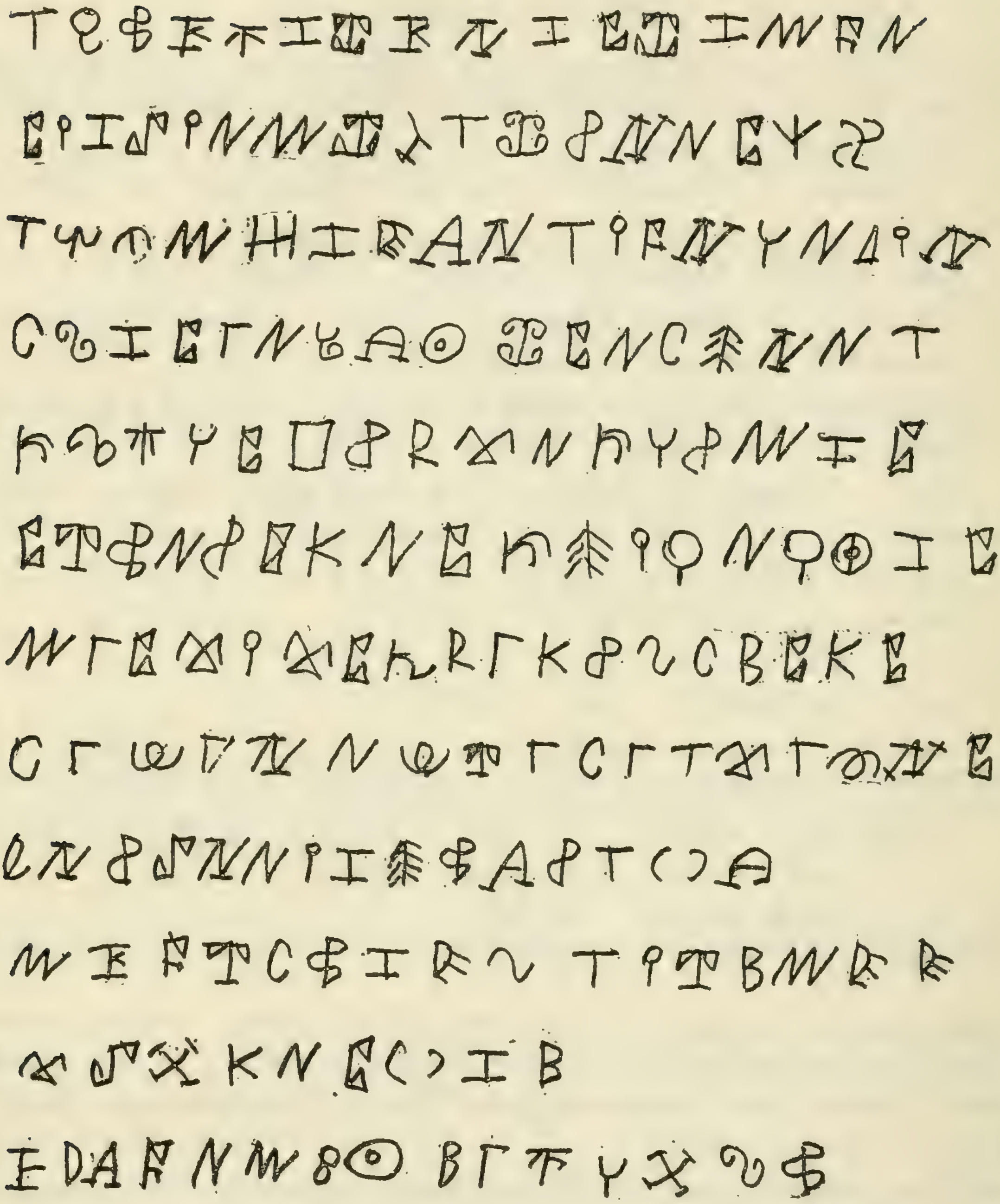


Figure 28.—A page of text from a song written by R., a man of Ifaluk.

Type 2. The syllabary diffused to Faraulep where the deficiencies of the writing became apparent, all consonant signs of the original alphabet now having syllabic values consisting only of consonants-plus-*i*. The Faraulepese, between 1907 and 1909, invented a whole new set of symbols, Type 1, taking some of the signs from their environment and their material culture and giving them as their values the names of these objects; other signs were made by altering the form of Type 2 symbols; a few may be of Japanese derivation; and some are the products of imagination. By 1909 the writing, of both types, had spread to eight atolls of the Central Carolines and it is still known on five of them today.

Previous authors have speculated that the writing represented the remains of a formerly more developed system, that it was related to scripts of the Asiatic mainland, that it was linked to Easter Island writing, etc. But it has been demonstrated that the Woleai syllabary represents a case of recent stimulus diffusion, like the Vai and Cherokee syllabaries.

The writing, which is still being added to by new inventors from time to time, represents only crudely the language it is used for. A symbol may be used for more than one syllable, and a syllable may be represented by more than one symbol. In time, more exact correspondence might develop. However, the writing will probably die out before this occurs.

LITERATURE CITED

American Board of Commissioners for Foreign Missions.
1886–1906. Annual reports. Boston.
Arago, J.
1822. Promenade autour du monde pendant les annèes 1817/1820 sur les Corvettes du Roi l'Uranie et la Physicienne commandees par M. Freycinet. Vol. 2. Paris.
Bliss, Theodora Crosby.
1906. Micronesia. Fifty years in the island world. Boston.
Brown, J. Macmillan.
1914. A new Pacific Ocean script. Man, vol. 14, No. 43, pp. 89–91.
1927. Peoples and problems of the Pacific. Vol. 1. London.
Burrows, Edwin G., and Spiro, Melford E.
1953. An atoll culture. New Haven.
Conklin, H. C.
1953. Hanunóo-English vocabulary. Univ. California Publ. Ling., vol. 9, pp. 1–290.
Damm, H.
1938. Zentralkarolinen. G. Thilenius, ed. Ergebnisse der Südsee-Expedition, 2 B, vol. 10, pt. 2.
Damm, H., and Sarfert, E.
1935. Inseln um Truk. G. Thilenius, ed., Ergebnisse der Südsee-Expedition, 2 B, vol. 6, pt. 2.
Diringer, David.
1948. The alphabet. New York.
Finsch, Otto.
1900. Carolinen und Marianen. Sammlung gemeinverständlicher wissenschaftlicher Vorträger, vol. 14, pp. 651–710.
Gardner, Fletcher.
1943. Philippine Indic studies. Indic Bull. No. 1, Ser. of 1943. San Antonio.
Girschner, Max.
1912–13. Die Karolineninsel und ihre Bewohner. Baessler-Archiv, vol. 2, pp. 123–215; vol. 3, pp. 165–190.
Goodenough, Ward H.
1953. Native astronomy in the Central Carolines. University Museum, Univ. Pennsylvania, Philadelphia.

HORNELL, JAMES.

1936. The canoes of Polynesia, Fiji, and Micronesia. Bernice P. Bishop Museum, Spec. Publ. 27, vol. 2.

IMBELLONI, J.

1951. Las "tabletes parlantes" de Pascua, monumentos de un sistema gráfico indo-oceánico. Runa, vol. 4, Nos. 1–2, pp. 89–177.

KITTLITZ, F. H. VON.

1858. Denkwürdigkeiten einer Reise nach dem russischen Amerika, nach Mikronesien und durch Kamtschatka. 2 vols. Gotha.

KRÄMER, A.

1937. Zentralkarolinen. G. Thilenius, ed. Ergebnisse der Südsee-Expedition, 2 B. vol. 10, pt. 1.

LESSA, WILLIAM A.

1950. Ulithi and the outer native world. Amer. Anthrop., vol. 52, pp. 27–52.

LÜTKE, F.

1835. Voyage autour du monde exécuté par ordre de sa Majeste l'Empereur Nicolas Ier. Paris.

MASON, W. A.

1920. A history of the art of writing. New York.

MEINICKE, CARL E.

1876. Die Inseln des Stillen Oceans. Leipzig.

MÉTRAUX, ALFRED.

1957. Easter Island. New York.

SARFERT, E., *see* DAMM, H., and SARFERT, E.

SMITH, ALFRED G.

1951. Gamwoelhaelhi ishilh Weleeya (guide to Woleai spelling). High Commissioner, Trust Territory of the Pacific Islands. Honolulu. (Mimeograph.)

SOMEKI, ATSUSHI.

1936. Karorin shoto no ki-sara ni tsuite (the wooden dishes used in the Caroline Islands). Japanese Journ. Ethnol., vol. 2, No. 2, pp. 172–190.

1945. Micuronejiya no fūdo to mingu (topography and implements of Micronesia). Tokyo.

SPIRO, MELFORD E.

1950. A psychotic personality in the South Seas. Psychiatry, vol. 13, pp. 189–204.

SPIRO, MELFORD E., *see* BURROWS, EDWIN G., and SPIRO, MELFORD E.

TABLE 1.—*Frequency of occurrence of syllables in 301 Woleai words*

[To illustrate: There are 4 occurrences of the syllable *a*, 1 of *ba*, 3 of *ca*, etc.]

	Vowels alone	b-	c-	ch-	d-	f-	g-	j-	k-	l-	lh-	m-	mw-	n-	nh-	ng-	ngh-	p-	r-	rw-	s-	sh-	t-	th-	z-	w-	y-
-a	4	1	3	1		22	20	1	8	20	5	10	4	2		8		10	8		3	6	13			7	18
-ah						2	1			2	2	4	2					1	1		1		6				1
-aa						2						7							1				3			1	1
-aah		1										2						1								1	1
-ae	8	8				5	1			4	7	7	2		1			3	3		1		11			6	19
-aeh												2														1	
-e		2				1	5		3	3	1	1			1	2		3	7		2		6			5	1
-ee	4	1				2			1	1		1							1	1	4		1				
-eeh																					1						
-i	30	1				3	12			4	21	3	1			1		8	3		13	4	5				
-ih	5						1			2								3				1				1	
-ii				1		1	1		1	2	1	1						1	1			1	2				
-o	2						8	6		4									5		5	2	10			1	
-oh																							1				
-oa	1	1				1	1						5								1					2	1
-oah																											2
-oe		2				1				2			6			1			2		1		2			2	1
-oeh										1									1								1
-u	8	4								1								2					2				
-uh	1	1																									
-uu	4									1	1												3				
-uuh	1																						1				
-v	2						2			5					1	1					1	1	1	1	4		
-vh	1	1																				1					
Terminal consonants alone			3	3	3	2	22	1	2	20	33	1	4	3	3	13	4	11	8	9	7	12	18	9		15	12

TABLE 2.—*Words written by Caroline Island natives in Caroline script*

[On left, words from Smith, in his orthography; on right, spelling of those words in native characters. Characters are shown by numbers assigned them in figures 25 and 26. Numbers in parentheses indicate number of times word is thus written, if more than once, by each informant. Double diagonals following the number of a character indicate that the character is apparently used for two successive syllables. Informant designations: R.=Maroligar; C.=Chiyemal; M.=Magilo; T.=Tachep; A.=Marutang.]

ae/ta	R.: III/3
ae/tae/i	R.: III/3/IV
ae/ta/i	R.: III/3/IV
ae/ta/i/fii/lh	R.: III/25/IV/VII/33
ae/to/u/la/p	R.: III/17/XIX/1/26
a/le/fah/pae/t	R.: I/33/32/66/25 (2)
baah/sh	R.: 4/20; C.: 4/20; M.: 4/20
ba/bi/o/rw	R.: 4/29/XVI/22
bae	R.: 4 (21); C.: 4
bae/s	R.: 4/XV; C.: 4/XV
bae/sh	R.: 4/XIII, 4/40; C.: 4/XIII; M.: 4/XIII
bae/y	R.: 4/III
bee/yae	R.: 4+IV/III
boa/d	R.: 13/XVII; C.: 13/XVII; M.: 13/XVII
boe/ga/re	R.: 4/46/35
buh/k	R.: 29/2
bu/n	R.: 29/6; C.: 29/6; M.: 29/6
bu/nh	R.: 29/6; C.: 29/6
ca/ng	R.: 18/12, 18/IX; C.: 18/12; M.: 18/12
ca/ngh	R.: 37/52
cha/ng	R.: 18/IX; C.: 18/IX; M.: 18/IX
ee/bae	R.: III/4
ee/tae	R.: III/25
ee/tae/mwa/lh	R.: III/3/19/33
ee/ta/l	R.: IV/3/33
faa/t-faa/t	R.: 32/25-32/25; C.: 32/25-32/25
Fae/la/la/p	R.: 66/1/1/26
fae/lv/w	R.: 32/36/39, 66/36/39
Fa/go/sa/p	R.: 32/56+IV/37/26
Fa/la/luu/s	R.: 66/1/36/62
fa/lh	R.: 32/X, 32/33 (2)
Fa/ra/gi/ye	R.: 32/35/VIII/III
fa/th-fa/th	R.: 32/17-32/17 (2); C.: 32/17-32/17
fa/th-fa/thv/lhi	R.: 32/17-32/17/X (4); C.: 32/17-32/17/X
fa/tii/lh	C.: 32/XVII/33; M.: 32/XVII/33
fa/ti/lh	R.: 32/XVII/X; C.: 32/XVII/X; M.: 32/XVII/X
fa/to/gi	R.: 32/17/VIII (7); C.: 32/17/VIII
fa/tv/lh	R.: 32/31/33; C.: 32/XVII/33
fi/to/u	R.: VII/17/XIX+39 (2)
foa/ri	R.: 27/XVIII (3); C.: 53/XVIII; M.: 27/XVIII
Foe/sha/v/la/p	R.: 32/20/16/1/26, 66/18/16/1/26; C.: 66/18/16/1/26; M.: 66/18/16/1/26; T.: 66/18/16/1/26 (2)
ga/bu/ngh	R.: 46/13/IX, 46/59/58
ga/ch	R.: 46/28
ga/fi/tae/g	R.: 46/VII/25/VIII (6); C.: 74/VII/25/VIII
gah/th	R.: 46/17; C.: 46/17
ga/i/ga/bu/ngv	R.: 46/IV/50/59/58 (2)
ga/i/ma/ngi/y	R.: 46/IV/11/IX/III, 2//23/IX/III
Ga/la/ya/li/ma/ng	R.: 46/33/I/X/11/IX
ga/lii/so/rw	R.: 46/33/68/47 (2)
ga/mwoe/lha	R.: 46/19/33
ga/mwoe/lhae/lhi	R.: 46/19/33/X (3), 46/19/33/33, 46/19/33/X+33; C.: 74/19/33/X
ga/re	R.: 46/35, 50/35; C.: 74/omitted
ga/wae/waa/y	R.: 46/39/39/III (2); C.: 50/14+IV/39/IV
ge/pa/t	R.: 50/43/25; C.: 50/43/25; M.: 50/43/25
ge/ra/gi/roe/gi/lhi	R.: 50/35/VIII/35/VIII/X
gi/sh	R.: VIII/20 (5); C.: VIII/20
goa/mw	R.: 2/19 C.: 2/19
go/mw	R.: 2/34; C.: 2/49
go/sh	R.: 2/5; C.: 2/5; M.: 2/5
go/zv/l	R.: 2/42/33
go/zv/lh	R.: 2/42/omitted
go/zv/lhi	R.: 2/42/X (5), 2/42/33; C.: VIII/omitted/33+X
gv/la	R.: 41/1; C.: 74/1
I/fae/lhuu/g	R.: IV/66/36/41; C.: IV/66/36/41
i/gae/lha	R.: IV/50/1 (3)
ih/a/j	R.: IV//46
ih/mw	R.: IV/19; C.: IV/19
ih/r	R.: IV/35
ih/sh	R.: IV/XV
ih/y	R.: IV/III (2), IV// (3)
i/le/gih/r	R.: IV/33/VIII/35; C.: IV/33/VIII/35
i/lha/gi/l	R.: IV/33/VIII/33; C.: IV/33/VIII/X
I/nge/lii/s	R.: IV/IX/33/XV (2)
i/shi	R.: IV/XIII (4), IV/XIII+III; C.: IV/XIII
i/shi/lh	R.: IV/XIII/33 (6), IV/XV/33, IV/XIII/1; C.: IV/XIII/X
i/shi/lhi	R.: IV/XIII/33, IV/XIII/X+IV
i/tae/lh	R.: IV/3/33
i/tae/lhi	R.: IV/3/X
i/ti/pae/lhi	R.: IV/XVII/26/X

TABLE 2.—*Words written by Caroline Island natives in Caroline script*—Continued

i/woe/ngoe	R.: IV/39/12
i/ya/ng	R.: IV/I/omitted
ja/lhae	R.: 46/33
jo-jo	R.: 2-2 (3); C.: 2-2
jo/sha	R.: 2/37; C.: 2/18
jo/sho/s	R.: 2/68/47
jo/soa/r	R.: 2/68/47
ka	R.: 46 (5)
ka/lh	R.: 50/1
ka/pa/tee/yae	R.: 50/43/25/III
ka/pe/ta/l	R.: 46/26/3/33 (6), 46/26/3/X (3); C.: 46/26/3/33, 46/26/3/X, 50/43/25/33
ka/pe/ta/lhi	R.: 46/26/3/X
kee/i	R.: 50+IV/III; C.: 46//
ke/pa/t	R.: 50/43/25 (14); C.: 50/43/25; M.: 50/43/25
ke/pa/te/ka/y	R.: 46/26/3/46/IV+III
lae	R.: 33
la/go/sha/g	R.: 1/2/18/41; C.: 1/2/18/41
lah/ng	R.: 1/IX; C.: 1/IX; M.: 1/IX
lhae/n	R.: 1/X
lhae/nh	R.: 1/X (2)
lhah/ng	R.: 1/52; C.: 1/52
lhah/ngh	R.: 1/52; C.: 1/52
lhi	R.: X (2)
lih/mw	R.: X/19; C.: X/11
lih/wa/nhae/y	R.: 36/39/33/IV
li/mee/g	R.: X/11+IV/50
maah/lh	R.: 23/36; C.: 23/36; M.: 23/36
maah/t	R.: 23/25, 23/17; C.: 23/25; M.: 23/25
maa/lhi	R.: 23/X
maa/sv/r	R.: 23/62/47; C.: 23/62/47
maa/t	R.: 23/25; C.: 23/25; M.: 23/25
maa/zv/r	R.: 23/62/47; C.: 23/62/47
mae	R.: 11 (9), 34 (2); C.: 11; M.: 11
maeh	R.: 11; C.: 11; M.: 23.
maeh/t	R.: 21/40
mae/lae	R.: 11/33 (7); C.: 11/1+III
mae/lae/l	R.: 11/33/33
mae/lhae	R.: 11/33 (2)
mae/lhae/l	R.: 19/33/33 (2)
mae/taa/lh	R.: 11/3/33 (2)
mah	R.: 23; C.: 23; M.: 23
mah/ch	R.: 23/20; M.: 21/28
mah/lh	R.: 23/36; C.: 23/36; M.: 23/36
ma/ngi/y	R.: 23/IX/III
ma/sha/ra/g	R.: 23/20/15/VIII (3); C.: 23/20/15/VIII
ma/tae-mae/tae/l	R.: 23/25–23/25/X
ma/th	R.: 23/17; C.: 23/17
mi/lh	R.: XI/33; C.: XI/33
mi/si/lh	R.: XI/XV/33
mi/si/lhae/lh	R.: XI/XV/33/33
mwae/lh	R.: 19/33
mwae/lhe/we	R.: 11/33/39
mwa/lhi	R.: 21/X
mwi/lh	R.: 67/33; C.: XI/33
mwoa/c-mwoa/c	R.: 34/5–34/5; C.: 49/5–49/5
mwoe/lae/lh	R.: 19/33/33
Na/mwoa/chii/g	R.: 1/34/20/VIII; M.: 1/49/20/VIII
nga/lhi	R.: 48/X
nga/li	R.: 48/X (2)
nge	R.: 12 (7)
nhe/pa/l	R.: 33/43/33 (4), 33/43/X
paah/i	R.: 43/IV; C.: 43/IV; M.: 43/IV
pah/nga/sh	R.: 43/48/20
pa/nga/lh	R.: 43/48/33 (3)
Pih/g	C.: XIV/50; M.: XIV/50
pih/pih	R.: XIV/XIV+III; C.: XIV/XIV; M.: XIV/XIV
pi/pi	R.: XIV/XIV+III; C.: XIV/XIV; M.: XIV/XIV+III
Pu/lo/wa/th	R.: 13/6/14/25
pu/nh	R.: 10/33; C.: 59/36
raa/sh	R.: 35/20
rac/lh	R.: 35/X (5), 35/33 (7), 35/33+X; C.: 35/omitted
rae/lhi	R.: 35/X (2); C.: 35/X
rae/so/rw	R.: 35/68/47
ra/ra/lh	R.: 15/15/33
re	R.: 35 (5)
re/bae	R.: 35/4 (4); C.: 35/4 (4)
roeh/sh	R.: 35/20
roe/sa/fa/to/gi	R.: 35/37/32/17/VIII
ro-ro	R.: 22–22; C.: 22–22
ro/w-ro/w	R.: 15/XIX–15/XIX
rwee/g	R.: 47+39+IV/50 (2)
Sae/pa/lh	R.: 37/43/33
sah/g	R.: 37/41

TABLE 2.—*Words written by Caroline Island natives in Caroline script*—Continued

Sa/taa/wa/l	R.: 37/25/14/33 (2); C.: 37/25/14/33; M.: 37/25/14/33; A.: 37/25/14/33
see/a/w	R.: 40//39 (6)
see/g	R.: 40+IV/50; C.: 40+IV/50; M.: 40+IV/50
seeh/gi	R.: 40+IV/VIII; C.: 40+IV/VIII; M.: 40+IV/VIII
see/mwoe/y	R.: 40/34/16 (2)
see/o/w	R.: 40//39
se/mwoe/y	R.: 40/34/16 (2)
sha/g	R.: 18/41 (3), 37/41
shib/m	R.: XIII/19; C.: XIII/19
sho/g	R.: 45/41 (5); C.: XV/omitted
shv	R.: 28; C.: 28+16
shvh/w	R.: 40/XIX; C.: 28/39
si	R.: XV (2)
si/a	R.: XV/I (3)
si/bae	R.: XV/4 (8); C.: XV/4
si/bae/gv/la	R.: XV/4/41/1 (3)
si/boe	R.: XV/4
si/fa/to/gi	R.: XV/32/17/VIII (2)
si/ga/l	R.: XV/46/33
si/mii/lh	R.: 40/23/36; C.: XV/XI/33
si/ti/pae/lhi	R.: XV/XVII/26/X
si/ya	R.: XV/I (3)
so/rw	R.: 68/47 (2)
So/w/g	R.: 42/XIX/2
ta/fee	R.: 3/66+III
ta/fee/y	R.: 3/66/III
tah/d	R.: 3/XVII; C.: 3/XVII; M.: 3/XVII
tah/l	R.: 3/33; C.: 3/33
tah/lh	R.: 3/X; C.: 3/X
tah/ng	R.: 3/IX; C.: 3/IX
tah/ngh	R.: 3/12; C.: 3/12
tah/t	R.: 3/25; C.: 3/25
ta/i	R.: 3/IV; C.: 3//
ta/pi/lh	R.: 18/XIV/omitted
Te/o/ma/l	R.: XVII/39/21/33
ti/li/gi/ae/lh	R.: XVII/X/VIII/III/X
ti/ri/gi	R.: XVII/X/VIII+III
toe/toe	R.: 38/38; C.: 38/38
to/g	R.: 17/2; C.: 17/2
toh/g	R.: 17/2; C.: 17/2
to/u/la/p	R.: 17/XIX/1/26 (3); C.: 17/XIX/1/26, 60//1/26
tu/tu	R.: 31/31; C.: 51/51
tuuh/t	R.: 31+16/31; C.: 31/31
tuu/t	R.: 31/31; C.: 31/31
tuu/tuu	R.: 31/31; C.: 31+16/31
uh/ng	R.: XIX/52; C.: XIX/12
u/lu/nhv/lhi	R.: XIX/65/65/X
u/ng	R.: XIX/52; C.: XIX/52
uuh/l	R.: 16/36; C.: 16/36
uu/r	R.: 16/35; C.: 16/35
uu/rw	R.: 16/47; C.: 16/35
uu/we	R.: IV/39 (4)
vh/l	R.: XIX+14/33; C.: 16/36
wae-wae	R.: 39-39; C.: 14-omitted
wae-wae/lh	R.: 39-39/omitted; C.: 39-39/X
We/lee/ya	R.: 39/33/I (14); C.: 39/33/I (6); M.: V/33+I/IV+III
wih/c	R.: XII/XIII; C.: XII/XIII
woa/lh	R.: V/X (2)
woa/lo/w	R.: V/6+XIX/39, 14/65/39
Woe/tte/ga/i/w	R.: 39/25/46/16//
yae	R.: III (2)
yae/be	R.: III/4 (10), I/4; C.: III/4 (2)
yae/be/ga/ch	R.: III/4/46/28
yae/fa/th	R.: III/32/17
yae/ga/fi/tae/g	R.: III/46/VII/25/VIII
yae/l	R.: III/33
yae/lo/g	R.: III/6/2
yae/mwoe/lh	R.: III/19/33
yae/tae/tae/l	R.: III/25/3/IV
yae/to/u/la/p	R.: I/17/XIX/1/26
yae/wa/l	R.: III/14/33
yae/wa/v/rii/s	R.: III/14/IV/35/XV
ya/f	R.: I/VII; C.: I/VII; M.: I/VII
yah/f	R.: I/66; C.: I/66; M.: I/66
ya/r	R.: I/35
ya/re/maa/t	R.: I/35/23/25; C.: I/35/23/25 (2)
ya/re/maa/taa/l	R.: I/35/23/3/X; C.: I/35/11/3/X
ya/sh	R.: I/20 (12), I/40
ya/th	R.: I/17
ya/to/we	R.: I/17/39
Ya/u/rw/pii/g	R.: I/XIX/8/XIV/50, III/XIX/8/XIV/50
yoah	R.: XVI; C.: II
yoah/la/gii/lh	R.: XVI/1/VIII/X; C.: I/6/omitted/X
yoa/rw	R.: XVI/22
yoeh	R.: XVI; C.: V

TABLE 3.—*Characters and their actual syllabic values, arranged according to sequence of characters in figures 25 and 26*

[Numbers in parentheses following a word indicate number of times, when more than once, the italicized syllable within that word is written by each informant with the designated character. Plus signs: in the first column plus signs indicate when two characters are used for a single syllable; in the second column they indicate when two syllables are written with one character. Informant designations: R.=Maroligar; C.=Chiyemal; M.=Magilo; T.=Tachep; A.=Marutang.]

Character No.	Syllables represented by character	Informant	Words in which character is used
I	a	R.	si*a* (3), *a*lefahpaet (2)
	ya	R.	*ya*remaataal, Welee*ya* (14), *ya*sh (13), si*ya* (3), *ya*towe, i*ya*ng, Gala*ya*limang, *ya*remaat, *Ya*urwpiig, *ya*r, *ya*th, *ya*f
		C.	*ya*remaataal, Welee*ya* (6), *ya*f, *ya*remaat (2)
		M.	*ya*f
	yah	R.	*yah*f
		C.	*yah*f
		M.	*yah*f
	yae	R.	*yae*be, *yae*toulap
	yoah	C.	*yoah*lagiilh
II	yoah	C.	*yoah*
III	ae	R.	tiligi*ae*lh, *ae*toulap, *ae*tai, *ae*ta, *ae*taifiilh, *ae*taei
	ee	R.	*ee*tae, *ee*taemwalh, *ee*bae
	i	R.	kee*i*
	ya	R.	*Ya*urwpiig
	yae	R.	*yae*be (10), *yae*wavriis, *yae*taetaei, *yae*begach, kapatee*yae*, *yae*mwoelh, *yae*log, *yae*l, *yae*fath, *yae*wal, *yae*gafitaeg, *yae* (2), bee*yae*
		C.	*yae*be (2)
	ye	R.	Faragi*ye*
	-y	R.	ih*y* (2), bae*y*, mangi*y*, gaimangi*y* (2), gawaewaa*y* (2), tafee*y*
IV	ee	R.	*ee*tal
	i	R.	*i*legihr, *i*shi (5), *i*lhagil, ta*i*, *I*ngeliis (2), *i*shilh (8), *i*shilhi (2), *i*taelhi, *i*yang, *i*taelh, *i*woengoe, *i*gaelha (3), yaetaetae*i*, aeta*i*, aeta*i*fiilh, ga*i*mangiy, *i*tipaelhi, ga*i*gabungv (2), aetae*i*, paah*i*, *I*faelhuug
		C.	*i*legihr, *i*shi, *i*lhagil, *i*shilh, paah*i*, *I*faelhuug
		M.	paah*i*
	ih	R.	*ih*y (2), *ih*sh, *ih*r, *ih*mw
		C.	*ih*mw
	ih+a	R.	*iha*j
	ih+y	R.	*ihy* (3)
	uu	R.	*uu*we (4)
	v	R.	yaewa*v*riis
	-y	R.	lihwanhae*y*
		C.	gawaewaa*y*
IV+III	ya	M.	Welee*ya*
	-y	R.	kepateka*y*
V	we	M.	*We*leeya
	woa	R.	*woa*low, *woa*lh (2)
	yoeh	C.	*yoch*
VI	none		
VII	fi	R.	*fi*tou (2), ga*fi*taeg (6), yaega*fi*taeg
		C.	ga*fi*taeg
	fii	R.	aetai*fii*lh
	-f	R.	ya*f*
		C.	ya*f*
		M.	ya*f*
VIII	gi	R.	ilha*gi*l, fato*gi* (7), gera*gi*roe*gi*lhi, tili*gi*aelh, roesafato*gi*, Fara*gi*ye, seeh*gi*, *gi*sh (5), sifato*gi* (2)
		C.	ilha*gi*l, fato*gi*, seeh*gi*, *gi*sh
		M.	seeh*gi*
	gih	R.	ile*gih*r
		C.	ile*gih*r
	gii	R.	yoahla*gii*lh
	go	C.	*go*zvlhi
	-g	R.	gafitae*g* (6), mashara*g* (3), yaegafitae*g*, Namwoachii*g*
		C.	gafitae*g*, mashara*g*
		M.	Namwoachii*g*
VIII+III	gi	R.	tiri*gi*
IX	nge	R.	I*nge*liis (2)
	ngi	R.	ma*ngi*y, gaima*ngi*y (2)
	-ng	R.	galayalima*ng*, cha*ng*, lah*ng*, tah*ng*, ca*ng*
		C.	cha*ng*, lah*ng*, tah*ng*
		M.	cha*ng*, lah*ng*
	-ngh	R.	gabu*ngh*

TABLE 3.—*Characters and their actual syllabic values, arranged according to sequence of characters in figures 25 and 26*—Continued

Character No.	Syllables represented by character	Informant	Words in which character is used
X	li	R.	ti*li*giaelh, *li*meeg, nga*li* (2), Galaya*li*mang
	lih	R.	*lih*mw
		C.	*lih*mw
	lhi	R.	rae*lhi* (2), fath-fathv*lhi* (4), gozv*lhi* (5), geragiroegi*lhi*, mwa*lhi*, nga*lhi*, ulunhv*lhi*, *lhi* (2), kapeta*lhi*, gamwoelhae*lhi* (3), sitipae*lhi*, maa*lhi*, itipae*lhi*, itae*lhi*
		C.	rae*lhi*, fath-fathv*lhi*, gamwoelhae*lhi*
	ri	R.	ti*r*igi (an error?)
	-l	R.	yaremaataa*l*, kapeta*l* (3), matae-maetae*l*, nbepa*l*
		C.	yaremaataa*l*, ilhagi*l*, kapeta*l*
	-lh	R.	yoahlagii*lh*, rae*lh* (5), tiligiae*lh*, fa*lh*, woa*lh* (2), fati*lh*, tah*lh*
		C.	yoahlagii*lh*, wae-wae*lh*, ishi*lh*, fati*lh*, tah*lh*
		M.	fati*lh*
	-n	R.	lhae*n*
	-nh	R.	lhae*nh* (2)
X+33	lhi	R.	gamwoelhae*lhi*
X+IV	lhi	R.	ishi*lhi*
XI	mi	R.	*mi*silhaelh, *mi*silh, *mi*lh
		C.	*mi*lh
	mii	C.	si*mii*lh
	mwi	C.	*mwi*lh
XII	wih	R.	*wih*c
		C.	*wih*c
XIII	-c	R.	wih*c*
		C.	wih*c*
	shi	R.	i*shi* (4), i*shi*lh (7), i*shi*lhi (2)
		C.	i*shi*, i*shi*lh
	shih	R.	*shih*m
		C.	*shih*m
	-sh	R.	bae*sh*
		C.	bae*sh*
		M.	bae*sh*
XIII+III	shi	R.	i*shi*
XIV	pi	R.	ta*pi*lh, *pi*pi
		C.	*pipi*
		M.	*pi*pi
	pih	R.	*pih*pih
		C.	*Pihg*, *pihpih*
		M.	*Pihg*, *pihpih*
	pii	R.	Yaurw*pii*g (2)
XIV+III	pi	R.	pi*pi*
		M.	pi*pi*
	pih	R.	pih*pih*
XV	si	R.	*si*bae (8), *si*baegvla (3), *si*boe, *si*gal, *si*ya (3), mi*si*lh, mi*si*lhaelh, *si* (2), *si*a (3), *si*fatogi (2), *si*tipaelhi
		C.	*si*bae, *si*miilh
	-s	R.	Ingelii*s* (2), yaewavrii*s*, bae*s*
		C.	bae*s*
	shi	R.	i*shi*lh
	sho	C.	*sho*g
	-sh	R.	ih*sh*
XVI	oa	R.	babi*oa*rw
	yoa	R.	*yoa*rw
	yoah	R.	*yoah*, *yoah*lagiilh
	yoeh	R.	*yoeh*
XVII	te	R.	*Te*omal
	ti	R.	*ti*ligiaelh, *ti*rigi, si*ti*paelhi, i*ti*paelhi, fa*ti*lh
		C.	fa*ti*lh
		M.	fa*ti*lh
	tii	C.	fa*tii*lh
		M.	fa*tii*lh
	tv	C.	fa*tv*lh
	-d	R.	boa*d*, tah*d*
		C.	boa*d*, tah*d*
		M.	boa*d*, tah*d*
XVIII	ri	R.	foa*ri* (3)
		C.	foa*ri*
		M.	foa*ri*
XIX	u	R.	Ya*u*rwpiig (2), to*u*lap (3), *u*lunhvlhi, yaeto*u*lap, aeto*u*lap, *u*ng
		C.	*u*ng, to*u*lap
	uh	R.	*uh*ng
		C.	*uh*ng
	w-	R.	so*w*g
	-w	R.	ro*w*-ro*w*, shvh*w*
XIX+14	vh	R.	*vh*l
XIX+39	u	R.	fito*u* (2)

TABLE 3.—*Characters and their actual syllabic values, arranged according to sequence of characters in figures 25 and 26*—Continued

Character No.	Syllables represented by character	Informant	Words in which character is used
1	la	R.	*la*goshag, yoah*la*giilh, tou*la*p (3), sibaegv*la* (3), aetou*la*p, yaetou*la*p, Fa*la*luus, Fae*lala*p, Foeshav*la*p (2), gv*la*
		C.	*la*goshag, tou*la*p (2), Foeshav*la*p, gv*la*
		M.	Foeshav*la*p
		T.	Foeshav*la*p (2)
	lah	R.	*lah*ng
		C.	*lah*ng
		M.	*lah*ng
	lha	R.	igae*lha* (3)
	lhah	R.	*lhah*ng, *lhah*ngh
		C.	*lhah*ng, *lhah*ngh
	lhae	R.	*lhae*n, *lhae*nh (2)
	-lh	R.	ishi*lh*, ka*lh*
	na	R.	*Na*mwoachiig
		M.	*Na*mwoachiig
1+III	lae	C.	mae*lae*
2	go	R.	la*go*shag, *go*sh, *go*mw, *go*zvl, *go*zvlh, *go*zvlhi (6)
		C.	la*go*shag, *go*sh, *go*mw
		M.	*go*sh
	goa	R.	*goa*mw
		C.	*goa*mw
	ga+i	R.	*gai*mangiy
	-g	R.	yaelo*g*, Sow*g*, to*g*, toh*g*
		C.	to*g*, toh*g*
	jo	R.	*jo*sha, *jo*-*jo* (3), *jo*soar, *jo*shos
		C.	*jo*sha, *jo*-*jo*
	-k	R.	buh*k*
3	ta	R.	kape*ta*l (9), *ta*i, ee*ta*l, ae*ta*, ae*ta*i, kape*ta*lhi, *ta*fee, *ta*feey
		C.	kape*ta*l (2)
	ta+i	C.	*tai*
	tah	R.	*tah*d, *tah*l, *tah*lh, *tah*ng, *tah*ngh, *tah*t
		C.	*tah*d, *tah*l, *tah*lh, *tah*ng, *tah*ngh, *tah*t
		M.	*tah*d
	taa	R.	yaremaa*taa*l, mae*taa*lh (2)
		C.	yaremaa*taa*l
	tae	R.	i*tae*lh, i*tae*lhi, ae*tae*i, ee*tae*mwalh, yaetae*tae*i
	te	R.	kepa*te*kay
4	ba	R.	*ba*bioarw
	baah	R.	*baah*sh
		C.	*baah*sh
		M.	*baah*sh
	bae	R.	*bae* (21), *bae*y, *bae*s, *bae*sh (2), ee*bae*, re*bae* (4), si*bae* (8), si*bae*gvla (3)
		C.	*bae*, *bae*s, *bae*sh, re*bae* (4), si*bae*
		M.	*bae*sh
	be	R.	yae*be* (12), yae*be*gach
		C.	yae*be*
	boe	R.	si*boe*, *boe*gare
4+IV	bee	R.	*bee*yac
5	-c	R.	mwoac-mwoac
		C.	mwoac-mwoac
	-sh	R.	go*sh*
		C.	go*sh*
		M.	go*sh*
6	la	C.	yoah*la*gilh
	lo	R.	yae*lo*g, Pu*lo*wath
	-n	R.	bu*n*
		C.	bu*n*
		M.	bu*n*
	-nh	R.	bu*nh*
		C.	bu*nh*
6+XIX	lo	R.	woa*lo*w
7	none		
8	rw-	R.	Yaur*w*piig (2)
9	none		
10	pu	R.	*pu*nh
11	ma	R.	gai*ma*ngiy, Galayali*ma*ng
	maa	C.	yare*maa*taal
	mae	R.	*mae*lae (7), *mae*lael, *mae*lhae (2), *mae*taalh (2), *mae* (9)
		C.	*mae*, *mae*lae
		M.	*mae*
	maeh	R.	*maeh*
		C.	*maeh*
	mwae	R.	*mwae*lhewe
	-mw	C.	lih*mw*
11+IV	mee	R.	li*mee*g

TABLE 3.—*Characters and their actual syllabic values, arranged according to sequence of characters in figures 25 and 26*—Continued

Character No.	Syllables represented by character	Informant	Words in which character is used
12	nge	R.	*nge* (7)
	ngoe	R.	iwoe*ngoe*
	-ng	R.	ca*ng*
		C.	ca*ng*, uh*ng*
		M.	ca*ng*
	-ngh	R.	tah*ngh*
		C.	tah*ngh*
13	boa	R.	*boa*d
		C.	*boa*d
		M.	*boa*d
	bu	R.	ga*bu*ngh
	pu	R.	*Pu*lowath
14	wa	R.	yae*wa*vriis, yae*wa*l, Pulo*wa*th, Sataa*wa*l (2)
		C.	Sataa*wa*l
		M.	Sataa*wa*l
		A.	Sataa*wa*l
	wae	C.	*wae*-wae
	woa	R.	*woa*low
14+IV	wae	C.	ga*wae*waay
15	ra	R.	masha*ra*g (3), *ra*ralh
		C.	masha*ra*g
	ro	R.	*ro*w-*ro*w
16	uu	R.	*uu*r, *uu*rw
		C.	*uu*r, *uu*rw
	uuh	R.	*uuh*l
		C.	*uuh*l
	v	R.	Foesha*v*lap (2)
		C.	Foesha*v*lap
		M.	Foesha*v*lap
		T.	Foesha*v*lap (2)
	vh	C.	*vh*l
	i+-w	R.	Woettega*iw*
	-y	R.	semwoe*y* (2), seemwoe*y* (2)
17	to	R.	fa*to*gi (7), *to*ulap (3), ae*to*ulap, yae*to*ulap, sifa*to*gi (2), roesafa*to*gi, ya*to*we, fi*tou* (2), *tog*
		C.	fa*to*gi, *to*ulap, *tog*
	toh	R.	*toh*g
		C.	*toh*g
	-t	R.	maah*t*
	thv	R.	fath-fa*thv*lhi (4)
		C.	fath-fa*thv*lhi
	-th	R.	fa*th*-fathvlhi (4), fa*th*-fa*th* (2), yaefa*th*, ya*th*, gah*th*, ma*th*
		C.	fa*th*-fa*th*, gah*th*, ma*th*, fa*th*-fathvlhi
18	ca	R.	*ca*ng (2)
		C.	*ca*ng
		M.	*ca*ng
	cha	R.	*cha*ng
		C.	*cha*ng
		M.	*cha*ng
	sha	R.	lago*sha*g, *sha*g (3), Foe*sha*vlap
		C.	lago*sha*g, Foe*sha*vlap, jo*sha*
		M.	Foe*sha*vlap
		T.	Foe*sha*vlap (2)
	ta	R.	*ta*pilh
19	mae	R.	*mae*lhael (2)
	-m	R.	shih*m*
		C.	shih*m*
	mwa	R.	eetae*mwa*lh
	mwae	R.	*mwae*lh
	mwoe	R.	ga*mwoe*lha, *mwoe*laelh, ga*mwoe*lhaelhi (5), yae*mwoe*lh
		C.	ga*mwoe*lhaelhi
	-mw	R.	ih*mw*, lih*mw*, goa*mw*
		C.	ih*mw*, goa*mw*
20	chii	R.	Namwoa*chii*g
		M.	Namwoa*chii*g
	-ch	R.	mah*ch*
	sha	R.	Foe*sha*vlap, ma*sha*rag (3)
		C.	ma*sha*rag
	-sh	R.	gi*sh* (5), ya*sh* (12), roeh*sh*, raa*sh*, pahnga*sh*, baah*sh*
		C.	gi*sh*, baah*sh*
		M.	baah*sh*
21	ma	R.	Teo*ma*l
	mah	M.	*mah*ch
	maeh	R.	*maeh*t
	mwa	R.	*mwa*lhi
22	ro	R.	*ro*-*ro*
		C.	*ro*-*ro*
	-rw	R.	yoa*rw*, babioa*rw*

TABLE 3.—*Characters and their actual syllabic values, arranged according to sequence of characters in figures 25 and 26*—Continued

Character No.	Syllables represented by character	Informant	Words in which character is used
23	ma	R.	*ma*sharag (3), *ma*tae-maetael, *ma*ngiy, gai*ma*ngiy, *ma*th
		C.	*ma*sharag, *ma*th
	mah	R.	*mah*, *mah*ch, *mah*lh
		C.	*mah*, *mah*lh
		M.	*mah*, *mah*lh
	maa	R.	*maa*t, *maa*svr, *maa*zvr, *maa*lhi, yare*maa*t, yare*maa*taal
		C.	*maa*t, *maa*svr, *maa*zvr, yare*maa*t (2)
		M.	*maa*t
	maah	R.	*maah*lh, *maah*t (2)
		C.	*maah*lh, *maah*t
		M.	*maah*lh, *maah*t
	mae	R.	matae-*mae*tael
	maeh	M.	*maeh*
	mii	R.	si*mii*lh
24	none		
25	ta	R.	ae*ta*ifiilh
		C.	kape*ta*l
	taa	R.	Sa*taa*wal (2)
		C.	Sa*taa*wal
		M.	Sa*taa*wal
		A.	Sa*taa*wal
	tae	R.	gafi*tae*g (6), yae*tae*taei, ee*tae*, ma*tae*-mae*tae*l, yaegafi*tae*g
		C.	gafi*tae*g
	tte	R.	Woc*tte*gaiw
	tee	R.	kapa*tee*yae
	-t	R.	kepa*t* (14), alefahpae*t* (2), maa*t*, maah*t*, gepa*t*, tah*t*, faa*t*-faa*t*, yaremaa*t*
		C.	kepa*t*, maa*t*, maah*t*, gepa*t*, faa*t*-faa*t*, tah*t*, yaremaa*t* (2)
		M.	kepa*t*, maa*t*, maah*t*, gepa*t*
	-th	R.	Pulowa*th*
26	pa	R.	ke*pa*tekay
	pae	R.	iti*pae*lhi, siti*pae*lhi
	pe	R.	ka*pe*tal (9), ka*pe*talhi
		C.	ka*pe*tal (2)
	-p	R.	toula*p* (3), aetoula*p*, yaetoula*p*, Fagosa*p*, Faelala*p*, Foeshavla*p* (2)
		C.	toula*p* (2), Foeshavla*p*
		M.	Foeshavla*p*
		T.	Foeshavla*p* (2)
27	foa	R.	*foa*ri (3)
		M.	*foa*ri
28	-ch	R.	yaebega*ch*, ga*ch*
		M.	mah*ch*
	shv	R.	*shv*
	shvh	C.	*shvh*w
28+16	shv	C.	*shv*
29	bi	R.	ba*bi*oarw
	bu	R.	*bu*n, *bu*nh
		C.	*bu*n, *bu*nh
		M.	*bu*n
	buh	R.	*buh*k
30	none		
31	tu	R.	*tutu*
	tuu	R.	*tuu*t, *tuutuu*
		C.	*tuu*t, tuu*tuu*
	tuuh	C.	*tuuh*t
	tv	R.	fa*tv*lh
	-t	R.	tuu*t*, tuuh*t*
		C.	tuu*t*, tuuh*t*
31+16	tuu	C.	*tuu*tuu
	tuuh	R.	*tuuh*t
32	fa	R.	*fa*th-*fa*thvlhi (4), *fa*th-*fa*th (2), *fa*togi (7), si*fa*togi (2), roesa*fa*togi, *fa*lh (3), yae*fa*th, *fa*tilh, *fa*tvlh, *Fa*gosap, *Fa*ragiye
		C.	*fa*th-*fa*thvlhi, *fa*th-*fa*th, *fa*togi, *fa*tilh, *fa*tiilh, *fa*tvlh
		M.	*fa*tilh, *fa*tiilh
	fah	R.	ale*fah*paet (2)
	faa	R.	*faa*t-*faa*t
		C.	*faa*t-*faa*t
	fae	R.	*fae*lvw
	foe	R.	*Foe*shavlap

TABLE 3.—*Characters and their actual syllabic values, arranged according to sequence of characters in figures 25 and 26*—Continued

Character No.	Syllables represented by character	Informant	Words in which character is used
33	la	R.	Ga*la*yalimang
	lae	R.	*lae*, mae*lae* (7), mae*lae*l, mwoe*lae*lh
	le	R.	i*le*gihr, a*le*fahpaet (2)
		C.	i*le*gihr
	lee	R.	We*lee*ya (14)
		C.	We*lee*ya (6)
	lii	R.	Inge*lii*s (2), ga*lii*sorw (2)
	-l	R.	ilhagi*l*, kapeta*l* (6), nhepa*l* (4), eeta*l*, gozv*l*, siga*l*, maelhae*l* (2), maelae*l*, yae*l*, yaewa*l*, Sataawa*l* (2), tah*l*, vh*l*, Teoma*l*
		C.	kapeta*l* (2), Sataawa*l*, tah*l*
		M.	Sataawa*l*
		A.	Sataawa*l*
	lha	R.	i*lha*gil, gamwoe*lha*
		C.	i*lha*gil
	lhae	R.	mae*lhae* (2), ja*lhae*, misi*lhae*lh, mae*lhae*l (2), gamwoe*lhae*lhi (5)
		C.	gamwoe*lhae*lhi
	lhe	R.	mwae*lhe*we
	lhi	R.	gozv*lhi*, ishi*lhi*, gamwoelhae*lhi*
	-lh	R.	rae*lh* (7), ishi*lh* (7), rara*lh*, fa*lh* (2), mwae*lh*, mwoelae*lh*, eetaemwa*lh*, misilhae*lh*, misi*lh*, Saepa*lh*, aetaifii*lh*, yaemwoe*lh*, maetaa*lh* (2), panga*lh* (3), itae*lh*, mi*lh*, mwi*lh*, fatv*lh*
		C.	simii*lh*, fatii*lh*, mi*lh*, mwi*lh*, fatv*lh*
		M.	fatii*lh*
	nhae	R.	lihwa*nhae*y
	nhe	R.	*nhe*pal (5)
	-nh	R.	pu*nh*
33+I	lee	M.	We*lee*ya
33+X	lhi	C.	gozv*lhi*
	-lh	R.	rae*lh*
34	mae	R.	*mae* (2)
	mwoa	R.	Na*mwoa*chiig, *mwoa*c-*mwoa*c
	mwoe	R.	se*mwoe*y (2), see*mwoe*y (2)
	-mw	R.	go*mw*
35	ra	R.	ge*ra*giroegilhi, Fa*ra*giye
	raa	R.	*raa*sh
	rae	R.	*rae*lh (13), *rae*lhi (2), *rae*sorw
		C.	*rae*lh, *rae*lhi
	re	R.	*re* (5), ga*re* (2), boega*re*, *re*bae (4), ya*re*maat, ya*re*maataal
		C.	*re*bae (4), ya*re*maataal, ya*re*maat (2)
	rii	R.	yaewav*rii*s
	roe	R.	geragi*roe*gilhi, *roe*safatogi
	roeh	R.	*roeh*sh
	-r	R.	ilegih*r*, ya*r*, ih*r*, uu*r*
		C.	ilegih*r*, uu*r*
	-rw	C.	uu*rw*
36	lih	R.	*lih*wanhaey
	luu	R.	Fala*luu*s
	lv	R.	fae*lv*w (2)
	-l	R.	uuh*l*
		C.	uuh*l*, vh*l*
	lhuu	R.	Ifae*lhuu*g
		C.	Ifae*lhuu*g
	-lh	R.	simii*lh*, mah*lh*, maah*lh*
		C.	mah*lh*, maah*lh*
		M.	mah*lh*, maah*lh*
	-nh	C.	pu*nh*
37	ca	R.	*ca*ngh
	sa	R.	roe*sa*fatogi, Fago*sa*p, *Sa*taawal (2)
		C.	*Sa*taawal
		M.	*Sa*taawal
		A.	*Sa*taawal
	sah	R.	*sah*g
	sae	R.	*Sae*palh
	sha	R.	*sha*g, jo*sha*
38	toe	R.	*toetoe*
		C.	*toetoe*
39	o	R.	Teomal
	wa	R.	lih*wa*nhaey
	waa	R.	gawae*waa*y (2)
		C.	gawae*waa*y
	wae	R.	*wae*-*wae*, *wae*-*wae*lh, ga*wae*waay (2)
		C.	*wae*-*wae*lh
	we	R.	*We*leeya (14), yato*we*, uu*we* (4), mwaelhe*we*
		C.	*We*leeya (6)
	woe	R.	i*woe*ngoe, *Woe*ttegaiw
	-w	R.	seea*w* (6), seeo*w*, woalo*w* (2), faelv*w* (2)
		C.	shvh*w*

TABLE 3.—*Characters and their actual syllabic values, arranged according to sequence of characters in figures 25 and 26*—Continued

Character No.	Syllables represented by character	Informant	Words in which character is used
40	se	R.	*se*mwoey (2)
	see	R.	*see*mwoey (2)
	see+a	R.	*seea*w (6)
	see+o	R.	*seeo*w
	si	R.	*si*miilh
	shvh	R.	*shvh*w
	-sh	R.	bae*sh*, ya*sh*
	-t	R.	maeh*t* (an error?)
40+IV	see	R.	*see*g
		C.	*see*g
		M.	*see*g
	seeh	R.	*seeh*gi
		C.	*seeh*gi
		M.	*seeh*gi
41	gv	R.	*gv*la, sibae*gv*la (3)
	-g	R.	sha*g* (4), sho*g* (5), lagosha*g*, sah*g*, Ifaelhuu*g*
		C.	lagosha*g*, Ifaelhuu*g*
42	so	R.	*so*wg
	zv	R.	go*zv*l, go*zv*lh, go*zv*lhi (6)
43	pa	R.	ke*pa*t (14), nhe*pa*l (5), ka*pa*teeyae, Sae*pa*lh, *pa*ngalh (3), ge*pa*t
		C.	ke*pa*t, ge*pa*t
		M.	ke*pa*t, ge*pa*t
	pah	R.	*pah*ngash
	paah	R.	*paah*i
		C.	*paah*i
		M.	*paah*i
	pe	C.	ka*pe*tal
44	none		
45	sho	R.	*sho*g (5)
46	ga	R.	*ga*re, *ga*fitaeg (6), *ga*mwoelha, si*ga*l, yaebe*ga*ch, *ga*bungh (2), *ga*mwoelhaelhi (5), *ga*imangiy, *ga*waewaay (2), boe*ga*$_r$e, *ga*ch, *ga*igabungv (2), Woette*ga*iw, *Ga*layalimang, yae*ga* fitaeg, *ga*liisorw (2)
	gah	R.	*gah*th
		C.	*gah*th
	ja	R.	*ja*lhae
	-j	R.	iha*j*
	ka	R.	*ka*petal (9), *ka*petalhi, kepate*ka*y, *ka* (5)
		C.	*ka*petal (2)
	ke	R.	*ke*patekay
	kee+i	C.	*keei*
47	-r	R.	maasv*r*, maazv*r*, josoa*r*
		C.	maasv*r*, maazv*r*
	-rw	R.	so*rw* (2), galiiso*rw* (2), raeso*rw*, uu*rw*
	-s	R.	josho*s* (an error?)
47+39+IV	rwee	R.	*rwee*g (2)
48	nga	R.	*nga*li (2), *nga*lhi, pa*nga*lh (3), pah*nga*sh
49	mwoa	C.	*mwoa*c-*mwoa*c
		M.	Na*mwoa*chiig
	-mw	C.	go*mw*
50	ga	R.	*ga*re, gai*ga*bungv (2)
		C.	*ga*waewaay
	gae	R.	i*gae*lha (3)
	ge	R.	*ge*ragiroegilhi, *ge*pat
		C.	*ge*pat
		M.	*ge*pat
	-g	R.	limee*g*, rwee*g* (2), Yaurwpii*g* (2), see*g*
		C.	see*g*, Pih*g*
		M.	see*g*, Pih*g*
	ka	R.	*ka*lh, *ka*pateeyae
		C.	*ka*petal
	ke	R.	*ke*pat (14)
		C.	*ke*pat
		M.	*ke*pat
50+IV	kee	R.	*kee*i
51	tu	C.	*tutu*
52	-ng	R.	lhah*ng*, u*ng*, uh*ng*
		C.	lhah*ng*, u*ng*
	-ngh	R.	lhah*ngh*, ca*ngh*
		C.	lhah*ngh*
53	foa	C.	*foa*ri
54	none		
55	none		
56+IV	go	R.	Fa*go*sap
57	none		
58	ngv	R.	gaigabu*ngv* (2)
	-ngh	R.	gabu*ngh*

Table 3.—*Characters and their actual syllabic values, arranged according to sequence of characters in figures 25 and 26*—Continued

Character No.	Syllables represented by character	Informant	Words in which character is used
59	bu	R.	gaiga*bu*ngv (2), ga*bu*ngh
	pu	C.	*pu*nh
60	to+u	C.	*tou*lap
61	none		
62	sv	R.	maa*sv*r
		C.	maa*sv*r
	-s	R.	Falaluu*s*
	zv	R.	maa*zv*r
		C.	maa*zv*r
63	none		
64	none		
65	lo	R.	woa*lo*w
	lu	R.	u*lu*nhvlhi
	nhv	R.	ulu*nhv*lhi
66	fa	R.	*Fa*laluus
	fae	R.	*fae*lvw, *Fae*lalap, I*fae*lhuug
		C.	I*fae*lhuug
	fee	R.	ta*fee*y
	foe	R.	*Foe*shavlap
		C.	*Foe*shavlap
		M.	*Foe*shavlap
		T.	*Foe*shavlap (2)
	-f	R.	yah*f*
		C.	yah*f*
		M.	yah*f*
	pae	R.	alefah*pae*t (2) (an error?)
66+III	fee	R.	ta*fee*
67	mwi	R.	*mwi*lh
68	so	R.	*so*rw (2), galii*so*rw (2), rae*so*rw
	soa	R.	jo*soa*r
	sho	R.	jo*sho*s
69	none		
70	none		
71	none		
72	none		
73	none		
74	ga	C.	*ga*re, *ga*fitaeg, *ga*mwoelhaelhi
	gv	C.	*gv*la
75	none		
76	none		
77	none		
78	none		

TABLE 4.—*Syllables and the characters used for them, arranged according to the phonemic sequence of table 1*

[Numbers in parentheses following a character designation indicate number of times, when more than once, that character is used, by each informant, to write the italicized syllable of the word preceding in the second column. Plus signs: in the first column plus signs indicate when two syllables are written with a single character; in the columns under informant designations they indicate when two characters are used to represent a single syllable. Informant designations: R.=Maroligar; C.=Chiyemal; M.=Magilo; T.=Tachep; A.=Marutang.]

Syllables	Words in which syllables occur	Character used by—				
		R.	C.	M.	T.	A.
a	si*a*	I (3)				
	*a*lefahpaet	I (2)				
ae	tilig*iae*lh	III				
	*ae*toulap	III				
	*ae*tai	III				
	*ae*ta	III				
	*ae*taifiilh	III				
	*ae*taei	III				
ee	*ee*tae	III				
	*ee*taemwalh	III				
	*ee*bae	III				
	*ee*tai	IV				
i	*i*legihr	IV	IV			
	*i*shi	IV (5)	IV			
	*i*lhagil	IV	IV			
	ta*i*	IV				
	*I*ngeliis	IV (2)				
	*i*shilh	IV (8)	IV			
	*i*shilhi	IV (2)				
	*i*taelhi	IV				
	*i*yang	IV				
	*i*taelh	IV				
	*i*woengoe	IV				
	*i*gaelha	IV (3)				
	yaetaetae*i*	IV				
	aeta*i*	IV				
	aeta*i*fiilh	IV				
	ga*i*mangiy	IV				
	*i*tipaelhi	IV				
	ga*i*gabungv	IV (2)				
	aetae*i*	IV				
	paah*i*	IV	IV	IV		
	*I*faelhuug	IV	IV			
	kee*i*	III				
i+-w	Woettega*iw*	16				
ih	*ih*y	IV (2)				
	*ih*sh	IV				
	*ih*r	IV				
	*ih*mw	IV	IV			
ih+a	*iha*j	IV				
ih+-y	*ihy*	IV (3)				
o	Te*o*mal	39				
oa	babi*oa*rw	XVI				
u	Ya*u*rwpiig	XIX (2)				
	to*u*lap	XIX (3)	XIX			
	*u*lunhvlhi	XIX				
	yaeto*u*lap	XIX				
	aeto*u*lap	XIX				
	*u*ng	XIX	XIX			
	fito*u*	XIX+39 (2)				
uh	*uh*ng	XIX	XIX			
uu	*uu*we	IV (4)				
	*uu*r	16	16			
	*uu*rw	16	16			
uuh	*uuh*l	16	16			
v	yaewa*v*riis	IV				
	Foesha*v*lap	16 (2)	16	16	16 (2)	
vh	*vh*l	XIX+14	16			
ba	*ba*bioarw	4				
baah	*baah*sh	4	4	4		
bae	re*bae*	4 (4)	4 (4)			
	si*bae*	4 (8)	4			
	bae	4 (21)	4			
	*bae*y	4				
	*bae*s	4	4			
	*bae*sh	4 (2)	4	4		
	ee*bae*	4				
	si*bae*gvla	4 (3)				
be	yae*be*	4 (11)	4 (2)			
	yae*be*gach	4				

TABLE 4.—*Syllables and the characters used for them, arranged according to the phonemic sequence of table 1*—Continued

Syllables	Words in which syllables occur	Character used by—				
		R.	C.	M.	T.	A.
bee	*bee*yae	4+IV				
bi	ba*bi*oarw	29				
boa	*boa*d	13	13	13		
boe	si*boe*	4				
	*boe*gare	4				
bu	*bu*n	29	29	29		
	*bu*nh	29	29			
	ga*bu*ngh	13, 59				
	gaiga*bu*ngv	59 (2)				
buh	*buh*k	29				
ca	*ca*ng	18 (2)	18	18		
	*ca*ngh	37				
-c	wih*c*	XIII	XIII			
	mwoa*c*-mwoa*c*	5–5	5–5			
cha	*cha*ng	18	18	18		
chii	Namwoa*chii*g	20		20		
-ch	yaebega*ch*	28				
	ga*ch*	28				
	mah*ch*	20		28		
-d	boa*d*	XVII	XVII	XVII		
	tah*d*	XVII	XVII	XVII		
fa	*fa*lh	32 (3)				
	*fa*tvlh	32	32			
	*fa*tilh	32	32	32		
	*fa*tiilh		32	32		
	*fa*th-*fa*th	32–32 (2)	32–32			
	*fa*th–*fa*thvlhi	32–32 (4)	32–32			
	*fa*togi	32 (7)	32			
	roesa*fa*togi	32				
	si*fa*togi	32 (2)				
	yae*fa*th	32				
	*Fa*gosap	32				
	*Fa*ragiye	32				
	*Fa*laluus	66				
fah	ale*fah*paet	32 (2)				
faa	*faa*t-*faa*t	32–32	32–32			
fae	*fae*lvw	32, 66				
	*Fae*lalap	66				
	I*fae*lhuug	66	66			
fee	ta*fee*	66+III				
	ta*fee*y	66				
fi	ga*fi*taeg	VII (6)	VII			
	*fi*tou	VII (2)				
	yaega*fi*taeg	VII				
fii	aetai*fii*lh	VII				
foa	*foa*ri	27 (3)	53	27		
foe	*Foe*shavlap	32, 66	66	66	66 (2)	
-f	ya*f*	VII	VII	VII		
	yah*f*	66	66	66		
ga	*ga*re	46, 50	74			
	*ga*fitaeg	46 (6)	74			
	boe*ga*re	46				
	yae*ga*fitaeg	46				
	*ga*ch	46				
	*ga*liisorw	46 (2)				
	yaebe*ga*ch	46				
	*ga*bungh	46 (2)				
	*ga*imangiy	46				
	*ga*mwoelha	46				
	*ga*mwoelhaelhi	46 (5)	74			
	si*ga*l	46				
	*ga*waewaay	46 (2)	50			
	*gaiga*bungv	46–50 (2)				
	Woette*ga*iw	46				
	*Ga*layalimang	46				
ga+i	*ga*imangiy	2				
gah	*gah*th	46	46			
gae	i*gae*lha	50 (3)				
ge	*ge*ragiroegilhi	50				
	*ge*pat	50	50	50		
gi	seeh*gi*	VIII	VIII	VIII		
	ilha*gi*l	VIII	VIII			
	fato*gi*	VIII (7)	VIII			
	sifato*gi*	VIII (2)				
	roesafato*gi*	VIII				
	tili*gi*aelh	VIII				
	*gi*sh	VIII (5)	VIII			

TABLE 4.—*Syllables and the characters used for them, arranged according to the phonemic sequence of table 1*—Continued

Syllables	Words in which syllables occur	Character used by—				
		R.	C.	M.	T.	A.
gi—Con.	gera*gi*roe*gi*lhi	VIII-VIII				
	tiri*gi*	VIII+III				
	Fara*gi*ye	VIII				
gih	ile*gih*r	VIII	VIII			
gii	yoahla*gii*lh	VIII				
go	la*go*shag	2	2			
	*go*sh	2	2	2		
	*go*mw	2	2			
	*go*zvl	2				
	*go*zvlh	2				
	*go*zvlhi	2 (6)	VIII			
	Fa*go*sap	56+IV				
goa	*goa*mw	2	2			
gv	sibae*gv*la	41 (3)				
	*gv*la	41	74			
-g	gafitae*g*	VIII (6)	VIII			
	mashara*g*	VIII (3)	VIII			
	yaegafitae*g*	VIII				
	Namwoachii*g*	VIII		VIII		
	yaelo*g*	2				
	Sow*g*	2				
	to*g*	2	2			
	toh*g*	2	2			
	lagosha*g*	41	41			
	sha*g*	41 (4)				
	sho*g*	41 (5)				
	sah*g*	41				
	Ifaelhuu*g*	41	41			
	limee*g*	50				
	rwee*g*	50 (2)				
	see*g*	50	50	50		
	Pih*g*		50	50		
	Yaurwpii*g*	50 (2)				
ja	*ja*lhae	46				
jo	*jo-jo*	2-2 (3)	2-2			
	*jo*soar	2				
	*jo*shos	2				
	*jo*sha	2	2			
-j	iha*j*	46				
ka	*ka*	46 (5)				
	kepate*ka*y	46				
	*ka*petalhi	46				
	*ka*petal	46 (9)	46 (2), 50			
	*ka*lh	50				
	*ka*pateeyae	50				
ke	*ke*pat	50 (14)	50	50		
	*ke*patekay	46				
kee	*kee*i	50+IV				
kee+i	*keei*		46			
-k	buh*k*	2				
la	tou*la*p	1 (3)	1 (2)			
	aetou*la*p	1				
	yaetou*la*p	1				
	*la*goshag	1	1			
	yoah*la*giilh	1	6			
	gv*la*	1	1			
	sibaegv*la*	1 (3)				
	Fa*la*luus	1				
	Foeshav*la*p	1 (2)	1	1	1 (2)	
	Fae*lala*p	1/1				
	Ga*la*yalimang	33				
lah	*lah*ng	1	1	1		
lae	*lae*	33				
	mae*lae*	33 (7)	1+III			
	mae*lae*l	33				
	mwoe*lae*lh	33				
le	i*le*gihr	33	33			
	a*le*fahpaet	33 (2)				
lee	We*lee*ya	33 (14)	33 (6)	33+I		
li	ti*li*giaelh	X				
	*li*meeg	X				
	nga*li*	X (2)				
	Galaya*li*mang	X				
lih	*lih*mw	X	X			
	*lih*wanhaey	36				
lii	Inge*lii*s	33 (2)				
	ga*lii*sorw	33 (2)				

TABLE 4.—*Syllables and the characters used for them, arranged according to the phonemic sequence of table 1*—Continued

Syllables	Words in which syllables occur	Character used by—				
		R.	C.	M.	T.	A.
lo	yae*lo*g	6				
	woa*lo*w	6+XIX, 65				
	Pu*lo*wath	6				
lu	u*lu*nhvlhi	65				
luu	Fala*luu*s	36				
lv	fae*lv*w	36 (2)				
-l	eeta*l*	33				
	gozv*l*	33				
	siga*l*	33				
	maelhae*l*	33 (2)				
	maclae*l*	33				
	yae*l*	33				
	yaewa*l*	33				
	tah*l*	33	33			
	Teoma*l*	33				
	ilhagi*l*	33	X			
	nhepa*l*	33 (4), X				
	Sataawa*l*	33 (2)	33	33		33
	kapeta*l*	33 (6), X (3)	33 (2), X			
	yaremaataa*l*	X	X			
	vh*l*	33	36			
	uuh*l*	36	36			
	matae-maetaa*l*	X				
lha	*ilha*gil	33	33			
	gamwoe*lha*	33				
	igae*lha*	1 (3)				
lhah	*lhah*ng	1	1			
	*lhah*ngh	1	1			
lhae	*lhae*n	1				
	*lhae*nh	1 (2)				
	ja*lhae*	33				
	mae*lhae*	33 (2)				
	mae*lhae*l	33 (2)				
	misi*lhae*lh	33				
	gamwoe*lhae*lhi	33 (5)	33			
lhe	mwae*lhe*we	33				
lhi	gozv*lhi*	33, X (5)	33+X			
	ishi*lhi*	33, X+IV				
	gamwoelhae*lhi*	33, X+33, X(3)	X			
	rae*lhi*	X (2)	X			
	fath-fathv*lhi*	X (4)	X			
	geragiroegi*lhi*	X				
	mwa*lhi*	X				
	nga*lhi*	X				
	ulunhv*lhi*	X				
	lhi	X (2)				
	kapeta*lhi*	X				
	maa*lhi*	X				
	itae*lhi*	X				
	itipae*lhi*	X				
	sitipae*lhi*	X				
lhuu	Ifae*lhuu*g	36	36			
-lh	yoahlagii*lh*	X	X			
	wae-wae*lh*		X			
	rae*lh*	X (5), 33 (7), 33+X				
	woa*lh*	X (2)				
	tah*lh*	X	X			
	fati*lh*	X	X	X		
	fa*lh*	X, 33 (2)				
	tiligiae*lh*	X				
	ishi*lh*	33 (7), 1	X			
	rara*lh*	33				
	mwae*lh*	33				
	mwoelae*lh*	33				
	eetaemwa*lh*	33				
	misilhae*lh*	33				
	misi*lh*	33				
	Saepa*lh*	33				
	aetaifii*lh*	33				
	yaemwoe*lh*	33				
	maetaa*lh*	33 (2)				
	panga*lh*	33 (3)				
	itae*lh*	33				
	fatii*lh*		33	33		
	mi*lh*	33	33			

TABLE 4.—*Syllables and the characters used for them, arranged according to the phonemic sequence of table 1*—Continued

Syllables	Words in which syllables occur	Character used by—				
		R.	C.	M.	T.	A.
-lh—Con.	mwi*lh*	33	33			
	fatv*lh*	33	33			
	simii*lh*	36	33			
	mah*lh*	36	36	36		
	maah*lh*	36	36	36		
	ka*lh*	1				
ma	*ma*th	23	23			
	*ma*sharag	23 (3)	23			
	*ma*tae-maetael	23				
	*ma*ngiy	23				
	gai*ma*ngiy	23, 11				
	Galayali*ma*ng	11				
	Teo*ma*l	21				
mah	*mah*	23	23	23		
	*mah*lh	23	23	23		
	*mah*ch	23		21		
maa	*maa*t	23	23	23		
	*maa*svr	23	23			
	*maa*zvr	23	23			
	*maa*lhi	23				
	yare*maa*t	23	23 (2)			
	yare*maa*taal	23	11			
maah	*maah*lh	23	23	23		
	*maah*t	23 (2)	23	23		
mae	*mae*lae	11 (7)	11			
	*mae*lbae	11 (2)				
	*mae*lael	11				
	*mae*taalh	11 (2)				
	mae	11 (9), 34 (2)	11	11		
	*mae*lhael	19 (2)				
	matae-*mae*tael	23				
maeh	*maeh*	11	11	23		
	*maeh*t	21				
mee	li*mee*g	11+IV				
mi	*mi*lh	XI	XI			
	*mi*silh	XI				
	*mi*silhaelh	XI				
mii	si*mii*lh	23	XI			
-m	shih*m*	19	19			
mwa	*mwa*lhi	21				
	eetae*mwa*lh	19				
mwae	*mwae*lh	19				
	*mwae*lhewe	11				
mwi	*mwi*lh	67	XI			
mwoa	*mwoa*c-*mwoa*c	34–34	49–49			
	Na*mwoa*chiig	34		49		
mwoe	se*mwoe*y	34 (2)				
	see*mwoe*y	34 (2)				
	ga*mwoe*lha	19				
	ga*mwoe*lhaelhi	19 (5)	19			
	*mwoe*laelh	19				
	yae*mwoe*lh	19				
-mw	ih*mw*	19	19			
	lih*mw*	19	11			
	goa*mw*	19	19			
	go*mw*	34	49			
na	*Na*mwoachiig	1		1		
-n	lhae*n*	X				
	bu*n*	6	6	6		
nhae	lihwa*nhae*y	33				
nhe	*nhe*pal	33 (5)				
nhv	ulu*nhv*lhi	65				
-nh	lhae*nh*	X (2)				
	bu*nh*	6	6			
	pu*nh*	33	36			
nga	*nga*li	48 (2)				
	*nga*lhi	48				
	pa*nga*lh	48 (3)				
	pah*nga*sh	48				
nge	*nge*	12 (7)				
	I*nge*liis	IX (2)				
ngi	ma*ngi*y	IX				
	gaima*ngi*y	IX (2)				
ngoe	iwoe*ngoe*	12				
ngv	gaigabu*ngv*	58 (2)				

TABLE 4.—*Syllables and the characters used for them, arranged according to the phonemic sequence of table 1*—Continued

Syllables	Words in which syllables occur	Character used by—				
		R.	C.	M.	T.	A.
-ng	ca*ng*	12, IX	12	12		
	galayalima*ng*	IX				
	cha*ng*	IX	IX	IX		
	lah*ng*	IX	IX	IX		
	tah*ng*	IX	IX			
	lhah*ng*	52	52			
	u*ng*	52	52			
	uh*ng*	52	12			
-ngh	tah*ngh*	12	12			
	ca*ngh*	52				
	lhah*ngh*	52	52			
	gabu*ngh*	58, IX				
pa	ke*pa*t	43 (14)	43	43		
	ge*pa*t	43	43	43		
	nhe*pa*l	43 (5)				
	*pa*ngalh	43 (3)				
	Sae*pa*lh	43				
	ka*pa*teeyae	43				
	ke*pa*tekay	26				
pah	*pah*ngash	43				
paah	*paah*i	43	43	43		
pae	siti*pae*lhi	26				
	iti*pae*lhi	26				
	alefah*paet*	66 (2) (error?)				
pe	ka*pe*tal	26 (9)	26 (2), 43			
	ka*pe*talhi	26				
pi	ta*pi*lh	XIV				
	pipi	XIV/XIV+III	XIV/XIV	XIV/XIV+III		
pih	*Pih*g		XIV	XIV		
	pihpih	XIV/XIV+III	XIV/XIV	XIV/XIV		
pii	Yaurw*piig*	XIV (2)				
pu	*Pu*lowath	13				
	*pu*nh	10	59			
-p	toula*p*	26 (3)	26 (2)			
	aetoula*p*	26				
	yaetoula*p*	26				
	Fagosa*p*	26				
	Faelala*p*	26				
	Foeshavla*p*	26 (2)	26	26	26 (2)	
ra	masha*ra*g	15 (3)	15			
	*rara*lh	15/15				
	ge*ra*giroegilhi	35				
	Fa*ra*giye	35				
raa	*raa*sh	35				
rae	*rae*sorw	35				
	*rae*lh	35 (13)	35			
	*rae*lhi	35 (2)	35			
re	*re*	35 (5)				
	*re*bae	35 (4)	35 (4)			
	ga*re*	35 (2)				
	boega*re*	35				
	ya*re*maat	35	35 (2)			
	ya*re*maataal	35	35			
ri	foa*ri*	XVIII (3)	XVIII	XVIII		
	ti*ri*gi	X (error?)				
rii	yaewav*rii*s	35				
ro	*ro*-*ro*	22–22	22–22			
	*ro*w-*ro*w	15–15				
roe	geragi*roe*gilhi	35				
	*roe*safatogi	35				
roeh	*roeh*sh	35				
-r	ya*r*	35				
	ih*r*	35				
	ilegih*r*	35	35			
	uu*r*	35	35			
	josoa*r*	47				
	maasv*r*	47	47			
	maazv*r*	47	47			
rw-	Yau*rw*piig	8 (2)				
rwee	*rwee*g	47+39+IV (2)				
-rw	babioa*rw*	22				
	yoa*rw*	22				
	uu*rw*	47	35			
	so*rw*	47 (2)				
	galiiso*rw*	47 (2)				
	raeso*rw*	47				

TABLE 4.—*Syllables and the characters used for them, arranged according to the phonemic sequence of table 1*—Continued

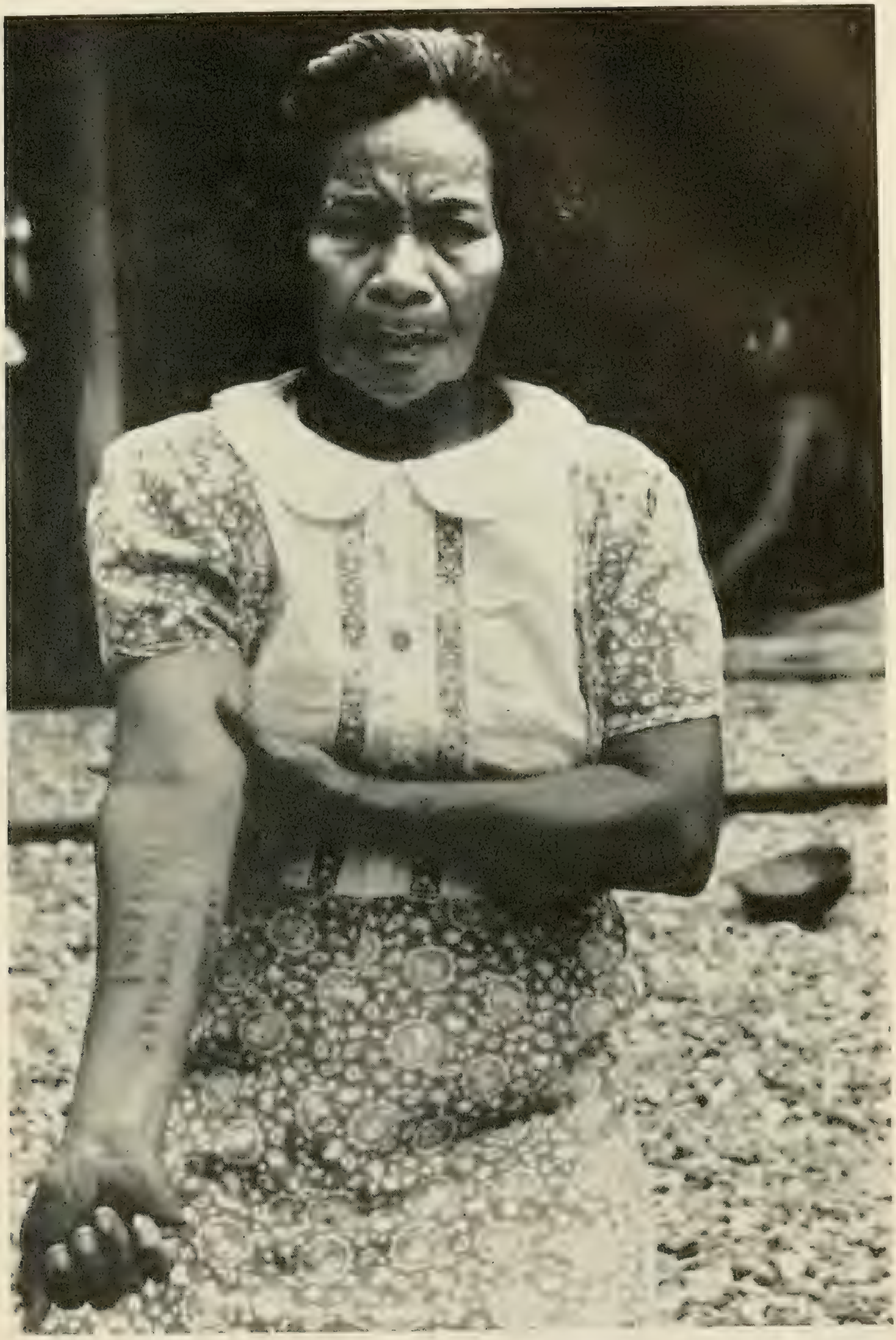
Syllables	Words in which syllables occur	Character used by—				
		R.	C.	M.	T.	A.
sa	roe*sa*fatogi	37				
	Fago*sa*p	37				
	*Sa*taawal	37 (2)	37	37		37
sah	*sah*g	37				
sae	*Sae*palh	37				
se	*se*mwoey	40 (2)				
see	*see*mwoey	40 (2)				
	*see*g	40+IV	40+IV	40+IV		
see+a	*seea*w	40 (6)				
see+o	*seeo*w	40				
seeh	*seeh*gi	40+IV	40+IV	40+IV		
si	*si*bae	XV (8)	XV			
	*si*boe	XV				
	si	XV (2)				
	*si*a	XV (3)				
	*si*ya	XV (3)				
	*si*baegvla	XV (3)				
	*si*gal	XV				
	*si*fatogi	XV (2)				
	*si*tipaelhi	XV				
	mi*si*lh	XV				
	mi*si*lhaelh	XV				
	*si*miilh	40	XV			
so	*So*wg	42				
	*so*rw	68 (2)				
	rae*so*rw	68				
	galii*so*rw	68 (2)				
soa	jo*soa*r	68				
sv	maa*sv*r	62	62			
-s	Ingelii*s*	XV (2)				
	yaewavrii*s*	XV				
	bae*s*	XV	XV			
	Falaluu*s*	62				
	josho*s*	47 (error?)				
sha	lago*sha*g	18	18			
	*sha*g	18 (3), 37				
	Foe*sha*vlap	18, 20	18	18	18 (2)	
	ma*sha*rag	20 (3)	20			
	jo*sha*	37	18			
shi	i*shi*	XIII (4), XIII+III	XIII			
	i*shi*lh	XIII (7), XV	XIII			
	i*shi*lhi	XIII (2)				
shih	*shih*m	XIII	XIII			
sho	*sho*g	45 (5)	XV			
	jo*sho*s	68				
shv	*shv*	28	28+16			
shvh	*shvh*w	40	28			
-sh	gi*sh*	20 (5)	20			
	roeh*sh*	20				
	raa*sh*	20				
	pahnga*sh*	20				
	ya*sh*	20 (12), 40				
	baah*sh*	20	20	20		
	bae*sh*	XIII, 40	XIII	XIII		
	go*sh*	5	5	5		
	ih*sh*	XV				
ta	kape*ta*l	3 (9)	3 (2), 25			
	*ta*l	3				
	ae*ta*i	3				
	ae*ta*	3				
	ee*to*l	3				
	kape*ta*lhi	3				
	*ta*fee	3				
	*ta*feey	3				
	*ta*pilh	18				
	ae*ta*ifiilh	25				
ta+i	*tai*		3			
tah	*tah*d	3	3	3		
	*tah*l	3	3			
	*tah*t	3	3			
	*tah*lh	3	3			
	*tah*ng	3	3			
	*tah*ngh	3	3			
taa	yaremaa*taa*l	3	3			
	mae*taa*lh	3 (2)				
	Sa*taa*wal	25 (2)	25	25		25

TABLE 4.—*Syllables and the characters used for them, arranged according to the phonemic sequence of table 1*—Continued

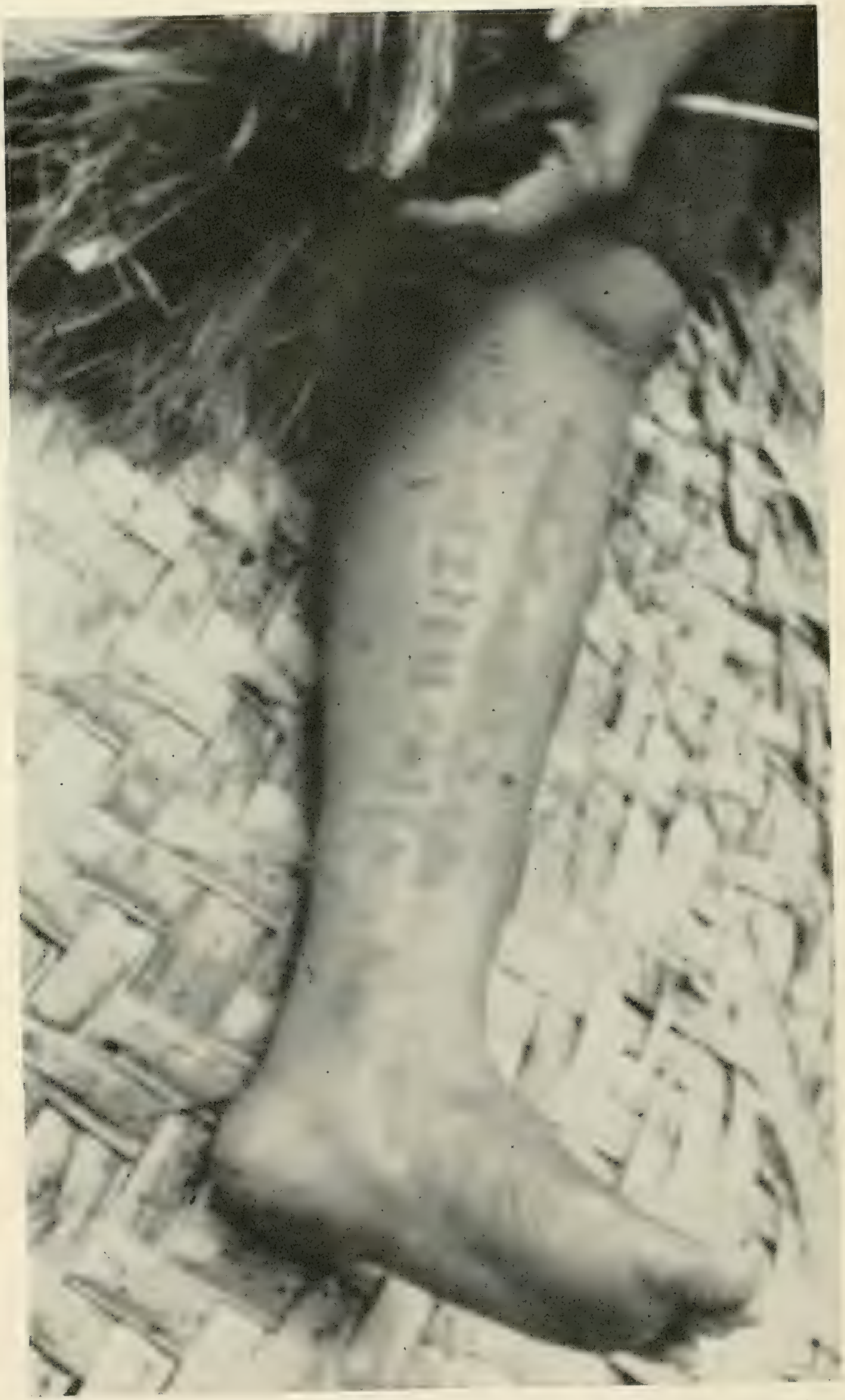
Syllables	Words in which syllables occur	Character used by—				
		R.	C.	M.	T.	A.
tae	ee*tae*mwalh	3				
	i*tae*lhi	3				
	ae*tae*i	3				
	i*tae*lh	3				
	yae*taetae*i	25/3				
	ma*tae*-mae*tae*l	25–25				
	ee*tae*	25				
	gafi*tae*g	25 (6)	25			
	yaegafi*tae*g	25				
te	kepa*te*kay	3				
	Woet*te*gaiw	25				
	*Te*omal	XVII				
tee	kapa*tee*yae	25				
ti	*ti*ligiaelh	XVII				
	*ti*rigi	XVII				
	si*ti*paelhi	XVII				
	i*ti*paelhi	XVII				
	fa*ti*lh	XVII	XVII	XVII		
tii	fa*tii*lh		XVII	XVII		
to	*to*ulap	17 (3)	17			
	ae*to*ulap	17				
	yae*to*ulap	17				
	fa*to*gi	17 (7)	17			
	sifa*to*gi	17 (2)				
	roesafa*to*gi	17				
	ya*to*we	17				
	fi*to*u	17 (2)				
	*to*g	17	17			
to+u	*tou*lap		60			
toh	*toh*g	17	17			
toe	*toetoe*	38/38	38/38			
tu	*tutu*	31/31	51/51			
tuu	*tuu*t	31	31			
	tuutuu	31/31	31+16/31			
tuuh	*tuuh*t	31+16	31			
tv	fa*tv*lh	31	XVII			
-t	kepa*t*	25 (14)	25	25		
	gepa*t*	25	25	25		
	alefahpae*t*	25 (2)				
	yaremaa*t*	25	25 (2)			
	tah*t*	25	25			
	faa*t*-faa*t*	25–25	25–25			
	maa*t*	25	25	25		
	maah*t*	25, 17	25	25		
	tuu*t*	31	31			
	tuuh*t*	31	31			
	maeh*t*	40 (error?)				
thv	fath-fa*thv*lhi	17 (4)	17			
-th	fa*th*-fathvlhi	17 (4)	17			
	fa*th*-fa*th*	17–17 (2)	17–17			
	yaefa*th*	17				
	gah*th*	17	17			
	ma*th*	17	17			
	ya*th*	17				
	Pulowa*th*	25				
zv	maa*zv*r	62	62			
	go*zv*l	42				
	go*zv*lhi	42 (6)				
	go*zv*lh	42				
w-	So*w*g	XIX				
wa	yae*wa*vriis	14				
	yae*wa*l	14				
	Pulo*wa*th	14				
	Sataa*wa*l	14 (2)	14	14		14
	lih*wa*nhacy	39				
waa	gawae*waa*y	39 (2)	39			
wae	*wae-wae*	39–39	14–missing			
	*wae-wae*lh	39–39	39–39			
	ga*wae*waay	39 (2)	14+IV			
we	*We*leeya	39 (14)	39 (6)	V		
	yato*we*	39				
	uu*we*	39 (4)				
	mwaelhe*we*	39				
wih	*wih*c	XII	XII			
woa	*woa*lh	V (2)				
	*woa*low	V, 14				

TABLE 4.—*Syllables and the characters used for them, arranged according to the phonemic sequence of table 1*—Continued

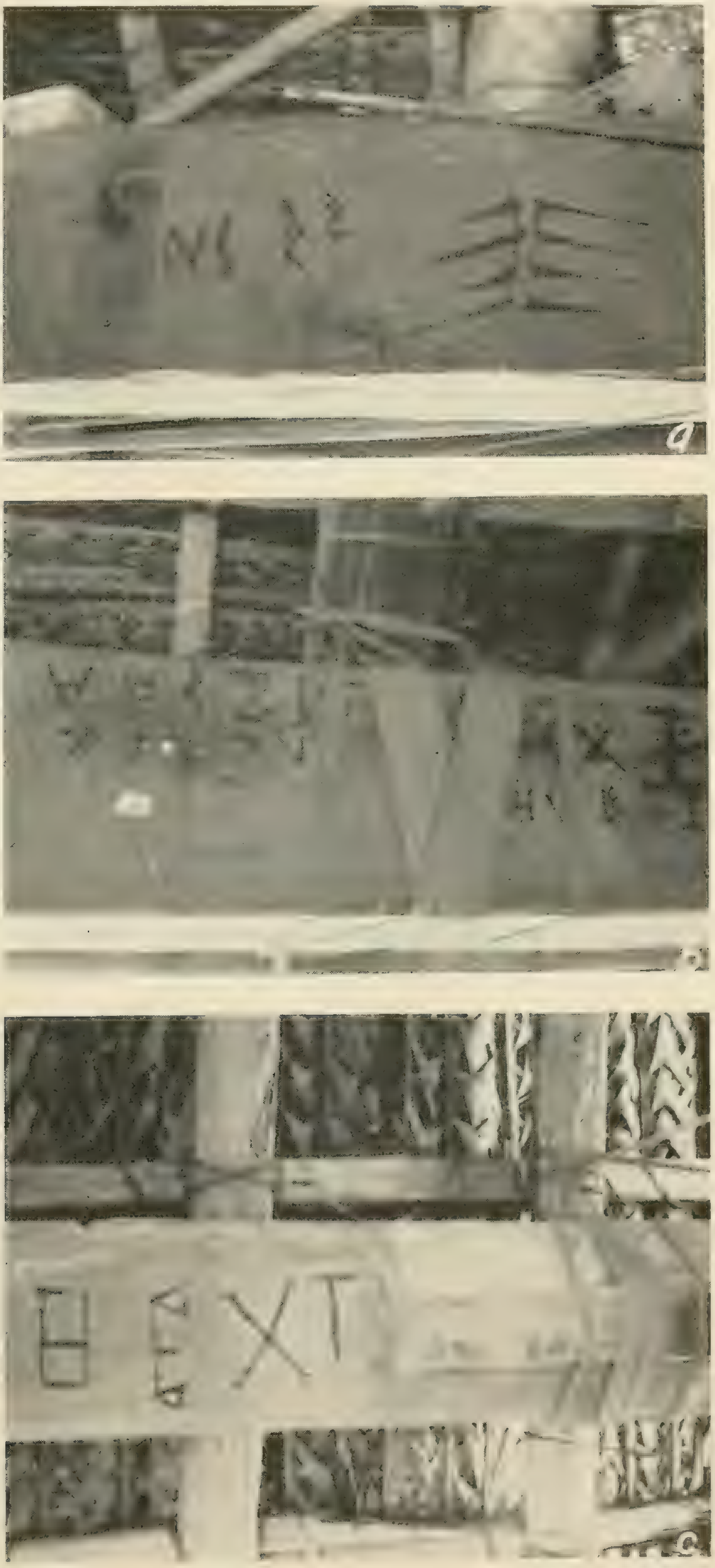
Syllables	Words in which syllables occur	Character used by—				
		R.	C.	M.	T.	A.
woe	i*woe*ngoe	39				
	*Woe*ttegaiw	39				
-w	seea*w*	39 (6)				
	seeo*w*	39				
	woalo*w*	39 (2)				
	faelv*w*	39 (2)				
	shvh*w*	XIX	39			
	ro*w*-ro*w*	XIX-XIX				
ya	*ya*r	I				
	*ya*th	I				
	*ya*f	I	I	I		
	*ya*remaat	I	I (2)			
	*ya*remaataal	I	I			
	*ya*sh	I (13)				
	*ya*towe	I				
	i*ya*ng	I				
	si*ya*	I (3)				
	Gala*ya*limang	I				
	*Ya*urwpiig	I, III				
	Weleey*a*	I (14)	I (6)	IV+III		
yah	*yah*f	I	I	I		
yae	*yae*	III (2)				
	*yae*be	III (10), I	III (2)			
	*yae*begach	III				
	*yae*l	III				
	*yae*log	III				
	*yae*fath	III				
	*yae*wal	III				
	*yae*wavriis	III				
	*yae*taetaei	III				
	*yae*mwoelh	III				
	*yae*gafitaeg	III				
	kapatee*yae*	III				
	bee*yae*	III				
	*yae*toulap	I				
ye	Faragi*ye*	III				
yoa	*yoa*rw	XVI				
yoah	*yoah*	XVI	II			
	*yoah*lagiilh	XVI	I			
yoeh	*yoeh*	XVI	V			
-y	semwoe*y*	16 (2)				
	seemwoe*y*	16 (2)				
	bae*y*	III				
	ih*y*	III (2)				
	mangi*y*	III				
	gaimangi*y*	III (2)				
	tafee*y*	III				
	gawaewaa*y*	III (2)	IV			
	lihwanhae*y*	IV				
	kepateka*y*	IV+III				



Tattooing in native script on arm of Maralatuy, a woman of Faraulep Island, Faraulep atoll. (Photographed by E. Quackenbush.)



Tattooing in native script on leg of Letaweribul, a woman of Falalap Island, Woleai atoll.
(Photographed by E. Quackenbush.)



Native script and Japanese *katakana* on canoe-house beams, Faraulep Island, Faraulep atoll. (*a*, *b*, Photographed by S. Kaneshiro; *c*, photographed by E. Quackenbush.)

SMITHSONIAN INSTITUTION
Bureau of American Ethnology
Bulletin 173

Anthropological Papers, No. 61

DAKOTA WINTER COUNTS AS A SOURCE OF PLAINS HISTORY

By JAMES H. HOWARD

CONTENTS

PAGE
Introduction 339
The winter counts 341
    Names and authorship 341
    Counts used for comparison 345
    Description of the counts 347
Literature cited 415
Phonetic table 416

ILLUSTRATIONS

PLATES

FOLLOWING PAGE
45. Blue Thunder Variant III (Yellow Lodge) winter count 416
46. Swift Dog's winter count (No. 674) 416
47. Jaw's winter count 416

DAKOTA WINTER COUNTS AS A SOURCE OF PLAINS HISTORY

By James H. Howard

INTRODUCTION

The existence among the Dakota Indians of calendars, in the form of charts giving a picture of a single outstanding event for each year, was first made public by Garrick Mallery in 1877 in a paper entitled "A Calendar of the Dakota Nation" (Mallery, 1877). These records, originally drawn on hides, later on pieces of cloth, are called waníyetu wowápi or "winter records" by the Dakota. Sometimes the variant terms waníyetu iyáwa and hékta yawápi (Mallery 1886, p. 128) are used, which mean "winter count" and "counting back" respectively.

The term waníyetu, "winter," is employed in two ways by the Dakota. The first, like the English word "winter," refers to the cold season of the year. In the other sense it refers to the year as a whole, the Dakota having no other word for this purpose. Thus, a person is spoken of as being so many "winters" old instead of being so many years of age. It is not surprising, then, to find that many of the events in a Dakota "winter" count actually took place during the spring, summer, and fall.

Subsequent to his first publication, mentioned above, Mallery published two further studies of Dakota winter counts (1886, pp. 89–127; 1893, pp. 266–328). These studies are monumental, and have become classics in the field. Curtis, in his "North American Indian" (1908, pp. 159–328) gives an Oglala count and compares it with the material given by Mallery. Vestal gives White Bull's count in his "Warpath" (1934 a, pp. 259–273) and a Hunkpapa count in "New Sources of Indian History 1850–91" (1934 b, pp. 348–351). Cohen (1942) in "Indians at Work" gives Big Missouri's count.[1]

In this paper I wish to supplement these earlier works with nine hitherto little-known winter counts from the Dakota of the Standing Rock Reservation, N. Dak. and S. Dak. Six of these are in the collections of the North Dakota State Historical Museum, Bismarck, and three are owned by the Mandan-Bismarck Indian Shriners organization of Mandan and Bismarck, N. Dak.[2]

---

[1] Cohen, 1939, pp. 16–20. Swift Bear's count, presented by Cohen in the January (pp. 18–21), February (pp. 30–31), and March (pp. 29–30), 1942, issues of the same magazine came to my attention too late for inclusion as comparative material in this paper. However, none of the data presented called for changes in the interpretations of the events in the counts presented here.

I undertook the present study with the object of determining the relative accuracy of the various counts by comparing them with one another and with known historic dates. As the work progressed several interesting additional uses suggested themselves. The counts might be used as a means of studying intertribal intercourse in the protohistoric and early historic periods. They might also be used to determine tribal locations and the dates of the introduction of important features of Dakota culture, such as the earth lodge, the horse, and the Sun dance. By emphasis, and reason for being noted by the maker of the count, it seems that the events selected reveal much of the ethos of Dakota culture for the period they cover.

It became apparent at once that the various counts, with the exception of the earlier parts of the Good, High Hawk, and White Bull counts, were quite reliable chronologically. The locations mentioned in the counts, which are suggested by the pictographs and were given orally to the persons who collected the counts, were also in remarkable agreement.

Concerning warfare and intertribal relations the results were less satisfying. It was found that the different counts, although presenting nearly identical pictographs for a given year, and obviously describing the same incident, ascribed entirely different identities to the participants. One account might mention that a Crow killed a Dakota, another that a Dakota killed a Crow, and still another that a Dakota was killed by an Arikara. The reason for this confusion became apparent when the interpretations of the pictographs in the Dakota language were translated for the two counts where the native texts had been preserved. These interpretations, usually only a short phrase, typically mentioned only that a certain person "was killed," leaving the tribal identification of the person and his assailant to whoever was keeping the winter count at the time.

Interesting changes were noted in the insignia used to identify persons of different tribal groups in the various counts, and in the earlier and later years of the same count. For example, the year 1797–98 on the Blue Thunder Variant III count is designated as "Killed Three Omahas on the River." The Omaha are indicated by their characteristic headdress, the deer tail and porcupine hair roach (Mallery, 1886, pp. 131–133). Yet later in the same count this roach is used merely to signify a dancer, a Dakota, for the years 1887–88 and again for the years 1928–29.

---

[2] The loan of these last three counts was arranged by Paul Ewald, a member of the Shriners and also of the North Dakota State Historical Society.

The progression of the pictographs in the counts, whether from right to left, left to right, or in a serpentine manner, was found to be of little significance. The unimportance of this feature has been ably discussed by Mallery (ibid., p. 95), and my own work merely tends to confirm this.

THE WINTER COUNTS

The nine unpublished counts which were studied were found to be variants of only three major counts. The three groups into which the counts fell were: The Blue Thunder group, containing five counts; the High Dog–Swift Dog group, containing two counts; and the Jaw group, containing two counts. For this reason, plus the high cost of reproduction, only three plates (pls. 45–47) accompany the text. The three counts selected were considered to be the clearest of the respective groups.

The counts were first studied individually, then compared with one another and with each of the counts given by Mallery, Curtis, Vestal, and Cohen. For purposes of study and reference, I have named and numbered the counts in the following manner.

NAMES AND AUTHORSHIP

1. Blue Thunder Count, Shriner cat. No. 136, (probably only a copy of the original Blue Thunder count, and possibly more recent than Blue Thunder Variants I, II, and III).

This count is done on heavy white canvas. It measures 264 by 74 cm. It is done in black ink and colored wax crayons and paint. The outlines and the colors black and dark blue are done in ink. Other coloring is done with red, yellow, blue, and green paint or crayons. The count starts at the upper right and goes to the left, spiraling inward. The years included in this count are 1785–86 to 1921–22.

The maker of this count is unknown. It is owned at the present time by the Mandan Indian Shriners organization. The count was secured by A. B. Welch in 1913, probably on the Standing Rock reservation. The translation is by one Thomas Ashley, whom Welch calls "a fullblood Dakota" in his notes. The interpretations of the meanings of the various pictographs are supposedly by Welch under the direction of Ashley and other Dakota informants. Much of Welch's material seems merely conjectural, however, and the very long and seemingly purely fanciful explanations accompanying some of the years have not been included in this paper. The count apparently pertains to the Sihasapa and Hunkpapa bands of the Teton Dakota and to the Yanktonai of the Standing Rock reservation.

2. No Two Horns, Shriner cat. No. 247 (a variant of the Blue Thunder count).

This count is done on heavy unbleached muslin. It measures 268 by 91 cm. Outlines of the pictographs and the colors blue and black are drawn in black ink. Other coloring is done with red, yellow, blue, and green wax crayons. Direction of the count is serpentine, starting at the upper right, going to the left, then back to the right below the first row, and so on. The years included in this count are 1785–86 to 1921–22.

This count was made by No Two Horns, a member of the Hunkpapa band of the Teton Dakota. The authorship of the count is verified by No Two Horns' pictographic signature. This count is owned by the Mandan Indian Shriners organization. The count was secured by A. B. Welch from No Two Horns in 1922. The translation is by "Joe Jordan" whom Welch calls "a Dakota volunteer of my organization in 1917" in his notes on the count. The count apparently pertains to the Hunkpapa and Sihasapa bands of the Teton Dakota and to the Yanktonai.

3. Blue Thunder Variant I, Museum cat. No. 798.

This count is done on heavy canvas, once white but now a dirty gray color. It measures 260 by 74 cm. Outlines of the pictographs and the colors black and dark blue are done in black ink. Other coloring is done with red, yellow, blue, and green wax crayons or paints. Direction of the count is from upper right to the left, spiraling inward. The maker of this count had a very poor sense of proportion and many of the pictographs interfere with one another. The count includes the years 1785–86 to 1912–13.

Authorship of the count is unknown. It is owned by the North Dakota State Historical Museum. The count was secured by the late Rev. A. McGaffey Beede at Fort Yates, N. Dak., and was given by him to the museum. A translation and interpretation of a winter count in Beede's handwriting seems to fit this count. Although the Reverend Mr. Beede is said to have known Dakota well, much of the interpretation of the count seems conjectural and has not been included in this paper. The count apparently pertains to the same bands and divisions of the Dakota as the preceding count.

4. Blue Thunder Variant II, Museum cat. No. 942.

This count is done on light unbleached muslin cloth. It measures 347 by 89 cm. Outlines of the pictographs and the colors dark blue and black are done in black ink. Other coloring is done in red, yellow, and blue paint and wax crayons. Direction of the count is from the upper right to the left, spiraling inward. The count includes the years 1785–86 to 1912–13.

Authorship of this count is unknown. The count is owned by the North Dakota State Historical Museum. It was secured by the Reverend Mr. Beede on the Standing Rock reservation. The translation and interpretation mentioned in connection with the preceding count fits this count equally well. The count apparently pertains, like the preceding three, to the Hunkpapa and Sihasapa bands of the Teton Dakota and to the Yanktonai.

5. Blue Thunder Variant III (Yellow-Lodge Count) Museum cat. No. L495.

This count is done on heavy unbleached muslin. It measures 340 by 86.5 cm. The pictographs are done in black ink and colored with red, yellow, blue, and green paint and crayons. The direction of the count is from upper right to the left, spiraling inward. The count includes the years 1785–86 to 1930–31.

The author of this count was Yellow-lodge, a Dakota of mixed Mdewakanton-Yanktonai descent who lived at Cannonball, N. Dak. It may be identified by the pictograph of an Indian sitting in a yellow tipi. A copy of this count, complete through 1951–52, was kept by Mrs. Teresa Yellow-lodge of Fort Yates, N. Dak., who showed it to the author in 1952.

The count is owned by Eugene Burdick of Williston, N. Dak., but was placed on indefinite loan with the North Dakota State Historical Museum in 1932. A partial translation of a Dakota winter count which Burdick believed belonged with this count was sent to the museum shortly after the count had been placed there on loan. This translation, however, does not fit the count. It apparently belongs with either the High Dog or Swift Dog count. Since the High Dog count was accompanied by an interpretation, and since the Swift Dog count was not, this Burdick interpretation has been placed with the Swift Dog count. Welch's interpretations for counts 1 and 2 and Beede's for 3 or 4 fit all but the later years of this count. For the reader's convenience, therefore, this count has been included with Blue Thunder Variants I and II in the list used for comparison.

All of the counts given above, which comprise the Blue Thunder group, seem to be copies of the same count or of one another. All but the Blue Thunder Variant I count have the printed phrase "Please pay $2.50 to see this map" preceding the first year's pictograph, indicating that financial emolument may have been an important incentive for a man to keep a winter count. The pictographs on the Blue Thunder count and those on the Blue Thunder Variant III count (Yellow-lodge count), up to the year 1912–13, were apparently drawn by the same person.

6. High Dog Count, Museum cat. No. 791.

This count is done on white muslin cloth. It measures 132 by 88 cm. Outlines of the pictographs and the colors dark blue and black are done in black ink. Other coloring is done in red, yellow, and green paint. The direction of the count is from upper left to the right, spiraling inward. This count includes the years 1797–98 to 1911–12.

The author of this count is given by Beede as "High Dog," but the count is nearly identical with that of Swift Dog. It was procured by the Reverend Mr. Beede, who writes "High Dog copied this for me from one which he had (about new)." With the count is an interpretation of the count in Dakota, apparently written by an Indian. This text is rather garbled. It is accompanied by what purports to be a translation and interpretation of this Dakota text and the count pictographs by Beede. Much of Beede's material seems to be merely conjectural, and, where the translation of the Dakota is possible, is often shown to be highly erroneous. Ray Schulenberg, formerly a member of the staff of the North Dakota State Historical Museum, Mrs. Eva Littlechief of Bismarck, N. Dak., and Judge Frank Zahn of Fort Yates, N. Dak., all aided the author in translating and interpreting the Dakota text. The count apparently pertains to the Hunkpapa and Sihasapa bands of the Teton Dakota and to the Yanktonai.

7. Swift Dog Count, Museum cat. No. 674.

This count is on thin white cotton cloth. It measures 136 by 90 cm. Outlines of the figures are in black ink, as are the colors black and dark blue. Other coloring is done with red, green, and yellow paint. The direction of the count is from upper left to the right, spiraling inward. The count includes the years 1797–98 to 1911–12.

This count is attributed to Swift Dog in the museum accession record. The Swift Dog and High Dog counts are nearly identical, and in my opinion were both made by the same man, Swift Dog. Pictographs on both are very similar in style to those on a pictograph by Swift Dog shown by Densmore (1918, pl. 70, opp. p. 403). The count was secured by the Reverend Mr. Beede on the Standing Rock Reservation. Burdick's supposed "Blue Thunder" interpretation fits the first 27 years of both the High Dog and Swift Dog counts. Since Beede's interpretation is labeled "High Dog," I have placed the Burdick interpretation with the Swift Dog count. Swift Dog was a member of the Hunkpapa band of the Teton Dakota (Densmore, 1918, p. 403). His count apparently pertains to the Hunkpapa and Sihasapa bands of the Teton and to the Yanktonai.

8. Jaw Count, Shriner's catalog No. 249.

This count is done on white muslin. It measures 125 by 87 cm. It is done in ink and red and blue paint. Only 1 year's pictograph utilizes this blue paint, however. The direction of the count is from upper left to right, spiraling inward.

This count is attributed to Jaw by Welch, and is signed "Mr. Charley Jaw" in the upper right-hand corner. Jaw was of two bands, one parent being of the Sansarc (Itazipco) band of the Teton Dakota, the other of the Hunkpapa band (Densmore, 1918, p. 387). The count was secured by A. B. Welch "from descendants of Jaw." Titles of the winters, written above the pictographs on the count, are by "an educated boy" according to Welch's notation. The count is accompanied by a typewritten interpretation by Welch, but since this was obviously taken directly from the titles written on the count itself it has been disregarded. Although the typewritten copy differs from the titles given on the count in some instances, it appears that it was Mr. Welch who was in error in most cases. The count includes the years 1837–38 to 1881–82. After the years 1881–82 the years are recorded by vertical marks, of which there are 35. This brings the actual closing date of the count to 1916–17.

9. Jaw Variant, Museum cat. No. L529.

This count is done on a commercially tanned sheepskin, which is a light tan in color. Maximum length of the hide is 91 cm., maximum width 90 cm. The pictographs are drawn in black and green ink. Coloring is done with red, yellow, blue, green, black, brown, and white paint. The white paint has caused a chemical action in some places, and the figures on which it is used are often slightly raised and rough. The direction of the count is from the middle top (neck of the hide) to the right, spiraling inward. Originally the count seems to have started at the lower right hind foot of the hide and proceeded to the left.

This count is of unknown authorship. It was secured by Usher L. Burdick on the Standing Rock Reservation. It was placed on loan with the North Dakota State Historical Museum in 1932. The count seems to have been copied from Jaw's count originally, and then extended backward at a later date. No translation or interpretation accompanies the count. Since it has been copied, in part, from Jaw's count, the two counts are treated together in the following list for the years where they are concurrent. The count includes the years 1822–23 to 1881–82.

COUNTS USED FOR COMPARISON

The counts used for comparison were:

1. The Flame count. (The Flame was a member of the Two Kettle (Oóheno^{n}pa) band of the Teton Dakota by birth, but lived with the Sansarc (Itázipco) band most of his life.) The count includes the years 1786–87 to 1876–77. The interpretation of the count is by the keeper (Mallery, 1886, p. 93).

2. The Swan count (Minneconjou band of the Teton Dakota). The count includes the years 1800–01 to 1870–71. Interpretation of the count is by "Jean Premeau," interpreter at Cheyenne Agency in 1868 (Mallery, 1886, pp. 93–94).

3. Lone Dog count. (Yanktonai, probably of the Lower Yanktonai division, now settled on the Crow Creek and Cheyenne River Reservations in South Dakota.) This count includes the years 1800–01 to 1870–71. Interpretations are by one Basil Clement (Mallery, 1886, pp. 89–93).

4. Bush count. (Dakota, band unknown). The count includes the years 1800–01 to 1869–70. The interpreter is unknown (Mallery, 1886, p. 94).

5. Mato Sapa count (Minneconjou band of the Teton Dakota). This count includes the years 1800–01 to 1868–69. The interpretations are by the keeper (Mallery, 1886, pp. 94–95).

6. Battiste Good count. (Brule (Sićanġu) band of the Teton Dakota). This count supposedly begins in mythological times. It actually seems to be based on history from 1700–01 to 1879–80. The interpretation is by Good (Mallery, 1886, p. 129; 1893, p. 268).

7. American Horse count (Oglala band of the Teton Dakota). This count includes the years 1775–76 to 1878–79. The interpretation of the count is by American Horse (Mallery, 1886, p. 129).

8. White-Cow-Killer count (Oglala or Brule band of the Teton Dakota (?)). The exact years included in this count are not given by Mallery, who uses the count only for comparison (Mallery, 1886, pp. 129–130).

9. Cloud Shield count (Oglala band of the Teton Dakota). This count includes the years 1777–78 to 1878–79. The interpretation of the count is by the keeper (Mallery, 1886, p. 129).

10. High Hawk count (Oglala band of the Teton Dakota). Like Battiste Good's count, this count supposedly begins in mythological times. Events which seem to be historical begin in "1540" (?). The closing date of the count is "1900." The interpretation of the count is by High Hawk (Curtis, 1908, p. 159).

11. White Bull count (Minneconjou band of the Teton Dakota). This count includes the years from "1781" to "1932." The interpretation of the count is by White Bull (Vestal, 1934 a, p. 259).

12. Vestal's Hunkpapa count (Hunkpapa band of the Teton Dakota). This count includes the years "1831" to "1881" (Vestal, 1934 b, p. 348). The interpretation of the count is by Judge Frank Zahn of Fort Yates, N. Dak. (Frank Zahn, personal communication).

13. Big Missouri's count (Brule Sičanġu) band of the Teton Dakota). This count includes the years "1796" to "1926." The interpretation of the count is by "Kills Two, a Sioux Indian, and several

other Indians." The count is owned by J. A. Anderson, of Rapid City, S. Dak. (Cohen, 1939, p. 16).

DESCRIPTION OF THE COUNTS

The counts are described in the following manner: First the written interpretations of the pictographs are given, then the pictographs are described, and then comparative material is introduced. Elision dots (. . .) indicate the omission of comment by Beede or Welch. Notes in brackets which are labeled "JH" indicate that the present writer has inserted comment in a quoted passage. Unlabeled comments in parentheses are by Welch or Beede.

In the count interpretations various colloquial tribal designations frequently occur. "Ree" refers to the Arikara. "Gros Ventre" refers to the Hidatsa. "Paláni" or "Padáni" refers to either the Pawnee or the Arikara, usually to the Arikara on the counts from the Standing Rock Reservation. "Hóhe" refers to the Assiniboin, or, possibly, to mixed Plains Ojibwa-Plains Cree-Assiniboin groups. "Omaha" refers to either the Ponca or the Omaha or to both tribes. "French" refers to the métis of the Red River region and Canada, usually of mixed French and Plains Ojibwa or Plains Cree descent. "Chippewa," in these counts, probably refers to the Turtle Mountain band of Plains Ojibwa.

The divisions of the Dakota tribe, which are referred to frequently in the interpretations of the counts, are, to the author's best understanding, as follows:

Santee group:

1. Mdéwakanton
2. Wahpéton
3. Wahpékute
4. Sisseton

Wiciyela group:

5. Yankton
6. Yanktonai

The Yanktonai are divided into two main groups, the Hunkpati (Upper Yanktonai) and Hunkpatina (Lower Yanktonai). The term "Wicéyela," and variants thereof, occur frequently in the count interpretations. Riggs states that this is "the name applied by the Tetons to the Yankton and Yanktonnais Dakotas" (Riggs, 1890, p. 571). It apparently refers to the dialect used by these bands, described as "childish" (probably because it lacks the flowery elaborations of Teton). Though Riggs states it was used for both Yankton and Yanktonai, the term may be restricted to the Yanktonai only in the counts from the Standing Rock Reservation.

7. Teton

The Teton were the largest of the seven Dakota bands. Consequently, though all seven bands were again divided into seven, only the Teton subdivisions are large enough to be worth noting here. They are:

1. Hunkpapa
2. Minneconjou
3. Sihásapa (Blackfoot)
4. Oóhenoⁿpa (Two Kettle)
5. Itázipčo (Sans Arcs or No Bows)
6. Sičánğu (Brules)
7. Oglála

1785–86

Blue Thunder: (beginning date for this count and its interpretation) "A woman in White (Spirit woman) came among us." No Two Horns: (beginning date for this count and its interpretation) "A long time ago we saw a Woman in White—a spirit woman." Blue Thunder Variants I, II, and III: (beginning dates for these counts and the interpretation used with them) "Saw a white woman dressed in white. It was near the ocean or mouth of the Missouri River." All of the above counts show a woman in white (clothing not colored) dress. Battiste Good gives this year, or a similar event, as 1791–92 (Mallery, 1893, p. 311).

1786–87

Blue Thunder: "Had a battle with the Grosventres where the Sisseton Reservation is now." No Two Horns: "They killed some Crows in the winter time. They shot at shadows." [Perhaps the Dakota found some of their enemies camped in tipis and shot at their outlines on the tipi wall as they passed between it and the fire, JH.] Blue Thunder Variants I, II, and III: "Battle with the Gros Ventres (Sisseton Reserve)." Blue Thunder, No Two Horns, and Blue Thunder Variants I and III show a man in a tipi. Blue Thunder Variant II shows a man outside a tipi. All are pictured wearing the "enemy" hairdress, which is a bunch of hair standing up at the forehead and a long braid falling down the back. This is commonly used in Dakota pictographs to designate members of enemy tribes, such as the Crow, Arikara, and Assiniboin. Battiste Good gives this event, or a similar one, for 1792–93 (Mallery, 1893, p. 311).

1787–88

Blue Thunder: "Dakota who had a long nose was killed in a battle with the Chippewas." No Two Horns " 'Straight Face' was killed by the enemy." Blue Thunder Variants I, II, and III: "Sioux with long nose killed by Chippewa." All counts show a man with a prominent nose and face and a wound with blood flowing from it. The representation of a wound in Dakota pictographs is a red circle with a red triangle pendent from it. The red circle represents the hole made by the bullet or other projectile and the red triangle represents blood flowing from this wound. On some of the counts this is quite conventionalized.

1788–89

Blue Thunder: " 'Long Hair' killed in a fight with an Omaha Indian." No Two Horns " 'Long Hair' killed an enemy in a great fight that winter." Blue Thunder Variants I, II, and III: "Long Hair, Sioux killed by Omaha." All counts show a man with long hair and a wound. The No Two Horns interpretation is probably incorrect, as none of the counts depict the man with the "enemy" hairdress. Good (Mallery, 1893, p. 311) gives this year as 1793–94, stating that "Long Hair" was a Crow killed by the Dakota. White Bull (Vestal, 1934 a, p. 262) gives the year "1811" as "They went out and killed Four Enemies with Long Hair."

1789–90

Blue Thunder: "A Dakota woman going for water in the night time was killed by the Omaha people." No Two Horns: "Man who owned a bell killed by the enemy." Blue Thunder Variants I, II, and III: "Woman killed in night by Omaha—going for water . . ." In all versions a man is depicted. He is wearing only a breechclout. The No Two Horns version plainly shows a bell in the man's hand, but the others all show a metal bucket or an animal's paunch, probably for carrying water. Representations of wounds are shown on the body of the man in all of the counts. Good gives this event for the year 1795–96, stating that this man was an enemy, and was betrayed by a Dakota girl whom he met when the girl came to the edge of the village to get water. He was ambushed by the Dakota and his corpse stood up outside the village with the girl's water paunch in his hand (Mallery, 1893, p. 312). White Bull gives the event for the year "1812" (Vestal, 1934 a, p. 262).

1790–91

Blue Thunder: "Sioux Indian killed in battle; a Wopohi Sioux." (Wopohi should probably be wapáha, a warbonnet, JH). No Two Horns "A Dakota put on a large bonnet. He went out, got killed by enemy." Blue Thunder Variants I, II, and III: "Sioux, Wopoha [probably *Wapáha*, warbonnet, JH.] killed in battle." All counts show a man wearing a warbonnet with wounds in his body. Good gives the event for the year 1796–97 (Mallery, 1893, p. 312). White Bull gives it for "1813" (Vestal, 1934 a, p. 262).

1791–92

Blue Thunder: "A one-eyed man, a Sihasapa, killed by the French." No Two Horns: "A noted Sioux named Big Head was killed that winter." Blue Thunder Variants I, II, and III: "One-eyed man (Blackfoot) killed by French." All counts show a man with one eye blacked out and wounds on his body. The No Two Horns interpretation is probably in error, as its pictograph is similar to the others.

1792–93

Blue Thunder: "A Chippewa woman killed by the Dakota." No Two Horns: "The woman in a red dress was killed by some enemy." Blue Thunder Variants I, II, and III: "Chippewa woman in red dress killed by Sioux." All counts show a woman with a red dress with wounds in her body.

1793–94

Blue Thunder: "Dakota camping. The Gros Ventre and Ree battle in night time and shot on leg. On Cheyenne river. Indians jumping." No Two Horns "Had a big fight and nearly everyone was chopped in the leg." Blue Thunder Variants I, II, and III: "Gros Ventres, Rees, and Mandans fought in a big battle on the Cheyenne River in night. Sioux kept jumping." All counts show a man shot in the leg below the knee or with the leg missing below the knee.

1794–95

Blue Thunder: "Gros Ventre a mile from Dakota camp, saw a man with a flute and killed him. On Crow Creek." No Two Horns: " 'The Man with a Flute' made a splendid kill of an enemy." Blue Thunder Variants I, II, and III: "Gros Ventres went to a Sioux camp and a man with a flute 1 mile out was killed (on Crow Creek)." All counts show a man playing an Indian flute with wounds on his body. This year's event corresponds with that given by American Horse for 1795–96, "The-Man-Who-Owns-the-Flute" was killed by the Cheyennes (Mallery, 1886, p. 133).

1795–96

Blue Thunder: "Gros Ventre and Ree in battle. Nearly all got shot on arm. Used shells for knife. West of Crow Creek." No Two Horns: "Another fight and everyone was clubbed in the arm." Blue Thunder Variants I, II, and III: "Gros Ventres and Arikaras fought with Sioux wounded in arms. Then then [sic, JH] they used shells for knives." All counts depict a man wounded in the arm.

1796–97

Blue Thunder: "Saw a ship coming across the ocean in winter time. First ship they saw." No Two Horns: "Somebody passed around a flag to the people." Blue Thunder Variants I, II, and III: "Saw a ship come across the ocean, it was winter and were camped by the ocean." All counts show a crude representation of the American flag for this year. Just how this is connected with the ship coming across the ocean mentioned in the interpretations of the Blue Thunder and Blue Thunder Variants I, II, and III counts is not certain.

1797–98

Blue Thunder: "We killed three Omaha in canoes on river." No Two Horns: "Three enemies in a boat were killed by Sioux winter." Blue Thunder Variants I, II, and III: "Three Omahas in a skiff on River killed by Tetons." The Blue Thunder count and Blue Thunder Variants I, II, and III show three men in a boat. These men wear the roach headdress used to indicate Omaha or Ponca. These men may well have been Ponca, as the same word is used for the two tribes by the Dakota. No Two Horns shows only one person, but representations of three wounds, one in the body of the man, two suspended in midair. This obviously suggests the three men pictured in the other counts. This type of "shorthand" device is frequently employed by No Two Horns throughout the count.

1798–99

Blue Thunder: "Dakota going to battle camped at night time Saw a big white horse with an arrow on it. Killed it." No Two Horns: "We shot a horse with a big mane winter." Blue Thunder Variants I, II, and III: "Sioux on battle camping saw and killed a horse with a big mane." All counts, including that of Blue Thunder, show a horse with an unusually long mane and a wound in its body.

High Dog: (beginning date for this count and its interpretation in Dakota and English) "Singing over blue feathers." The Dakota text reads "Wiyaka toto an akici lowanpi (Wíyaka tóto un akíčilòwanpi, lit. Feathers blue using (or wearing) they-sing-for-one-another)." Swift Dog: (beginning date for this count and the Burdick "Blue Thunder" interpretation, which is used with it) "Singing over Blue society feathers." On these two counts we see a man receiving a highly decorated wand from another man. This suggests the Hunká or Alówanpi ceremony of the Dakota. A rather wordy discussion by Beede tends to confirm this. Densmore (1918, p. 69) mentions the year of the first Alówanpi as "1801" stating that this event appears on

"Black Thunder's count." Since the year 1801–02 is also designated by a drawing of this ceremony on the High Dog and Swift Dog counts the author believes that Densmore is incorrect in this assumption. Since, however, she gives only this one year, comparison is not possible.

1799–1800

Blue Thunder: "Winter time, no water. Found beaver holes to get water." No Two Horns: "So cold we got water from beaver holes only." Blue Thunder Variants I, II, and III: "Water from beaver holes all frozen in winter." The Blue Thunder and Blue Thunder Variant III counts show a beaver with a tipi on his back. No Two Horns shows a beaver den, a beaver, and a metal water pail. Blue Thunder Variants I and II show a beaver, a water pail, and a tipi. See the High Dog and Swift Dog counts for the following year for comparison.

High Dog: "A White-man called Chaske [Čáske, first-born son of a previously unmarried woman, JH] came to this tribe and staid permanently for the purpose of trade. Previous to this time traders had come and gone after a short stay." The Dakota text reads "Claske wasicu taka mako el hi (*Časke* (*Ieska*?) *wašicu toká máka el hi* lit. First-born-son (one who spoke many languages?) white-man enemy country there came)." Swift Dog: "Clark, a white man, the first to come among the Sioux." American Horse (Mallery, 1886, p. 134) gives this year a similar interpretation, as does White-Cow-Killer (Mallery, 1886, p. 134). Cloud Shield (Mallery, 1886, p. 134) gives this event for the year 1800–01.

1800–01

Blue Thunder: "Small pox sickness. I think. Many die. Ota-ota [many, many, JH]." No Two Horns: "Everybody sick winter. Small pox time." Blue Thunder Variants I, II, and III: "Small pox, many many died." All of the above counts show a male figure with spots covering his body. The Flame, Lone Dog, Swan, Good, White-Cow-Killer, Mato Sapa, and Bush counts all mention an epidemic for the year 1801–02 (Mallery, 1886, p. 103). White Bull gives the occurrence for the year "1818" (Vestal, 1934 a, p. 263). High Hawk gives the year as "1802" (Curtis, 1908, p. 170).

High Dog: "This was an exceptionally dry year. . . . Water was sometimes found by digging in beaver holes." The Dakota text reads "Capa oti miniyaweyapi (lit. Beaver house-at they-came-and-got-water)". Swift Dog: "Beaver's Dam where Indians and beasts go to water." The High Dog and Swift Dog counts show a beaver above a small green rectangle. See the Blue Thunder, No Two

Horns, and Blue Thunder Variants I, II, and III for the preceding year for comparison.

1801–02

Blue Thunder: "Wild horses caught on prairie. First horses they owned." No Two Horns "Caught many wild horses winter." Blue Thunder Variants I, II, and III: "Caught lot of wild horses on prairie." The Blue Thunder and Blue Thunder Variant counts I, II, and III show several horses' heads. No Two Horns shows one horse head and several hoofprints, which seem to indicate plurality. The Flame, Lone Dog, Swan, Mato Sapa, Bush, White-Cow-Killer, and Good counts all give the year 1802–03 for this event (Mallery, 1886, p. 104). White Bull gives the year as "1819" (Vestal, 1934 a, p. 263). High Hawk gives it as "1803" (Curtis, 1908, p. 170). Good states that the horses were taken from the Pawnee (Mallery, 1886, p. 104).

High Dog: Beede's interpretation, which is rather long and is apparently not based upon the Dakota text, suggests an Alówa^{n}pì or Hunká ceremony for this year. The Dakota text reads "Tahin an akicilo wapi (*Táhi*^{n} *u*^{n} *akíčilòwanpì* lit. Moose- (probably bison is actually meant) hair using (or wearing) they-sing-for-one-another)." Swift Dog: "Singing over people with buffalo hair ornaments, a society." The pictographs on both counts show a man receiving a decorated wand from another, as for the year 1798–99. Densmore gives the year 1801 as the "first year *Alówa*^{n}*pi* in which the ceremony was held by the Standing Rock Sioux" (Densmore, 1918, p. 69).

1802–03

Blue Thunder: "Found a curly horse." No Two Horns: "We got many curly horses winter." Blue Thunder Variants I, II, and III: "They found a curley horse." High Dog: "The Sioux captured some crinkle haired horses from the Crows." The Dakota text reads "Sugugu lo awicakilipi (*Šunġuġulà áwičàglipì* lit. Horses curly-haired [thought to have had their hair singed ?, JH] little they-brought-back.)" Swift Dog: "A young man by the name of 'Wears one Feather' brought back a curly horse he captured from his enemy."

All of the above counts show a representation of a horse with curly hair. The No Two Horns count shows a number of hoofprints in addition, indicating plurality. The Flame, Lone Dog, Swan, White-Cow-Killer, Mato Sapa, Bush and Good counts all mention this event as well, but for the following year, 1803–04 (Mallery, 1886, p. 104). High Hawk gives the year "1804" for this event

(Curtis, 1908, p. 170.). White Bull has it occurring in "1820" (Vestal, 1934 a, p. 263).

The Flame states that the horses were taken from the Assiniboin (Mallery, 1886, p. 104). Lone Dog and White-Cow-Killer state that they were taken from the Crow (Mallery, 1886, p. 104). The Swan and Mato Sapa say they were taken from the Arikara (Mallery, 1886, p. 104), and Good states that they were taken from the Pawnee (Mallery, 1886, p. 104).

1803–04

Blue Thunder: "Saw a lot of horses with iron shoes on, way down southway." No Two Horns: "Many council winter." Blue Thunder Variants I, II, and III: "They saw a lot of horses w. [with, JH] shoes on. It was at Goose Creek way south." High Dog: "The Sioux captured some shod horses from the Crows." The Dakota text reads "Sake maza awicakilipi (*Šaké-mazà awičáglipì* lit. Hooves-metal they-brought-back)." Swift Dog: "A young man dressed in a blue coat brought an American horse with horse shoes on, the first ones seen by the redmen of the Sioux." Blue Thunder, No Two Horns, and Blue Thunder Variants II and III show the hoofprints of shod horses. Blue Thunder Variant I, High Dog, and Swift Dog show a horse, carefully depicting his hooves as being shod.

It may be that the year given by Mallery, Curtis, and Vestal which I have compared with the Blue Thunder, No Two Horns and Blue Thunder Variants I, II, and III for the year 1801–02 might better be placed here for comparison, though they precede the "curly horse" winter in all cases.

1804–05

Blue Thunder: "Winter camp at a place called 'Many Horses Tails'." No Two Horns: "Many Horses Tails camping Winter. They sing with them too." Blue Thunder Variants I, II, and III: "Wintered at 'Many Horses Tails'." The above counts show a decorated feather wand, suggesting the Hunká or Alówanpi ceremony. The Flame, Long Dog, Swan, Mato Sapa, Bush, and Good counts all have the same event for this year as well (Mallery, 1886, p. 104). High Hawk's count gives it for "1805" (Curtis, 1908, p. 171). White Bull gives it for the year "1821" (Vestal, 1934 a, p. 263). High Dog and Swift Dog apparently lose a year here, as they give the event used for the following year on the counts of the Blue Thunder group.

High Dog: "Eight Sioux were killed by the Crows in a running battle." The Dakota text reads "kangi wicasa 8 wicaktepi (lit. Crow men eight they-killed)." Swift Dog: "Seven Crow Indians were hid in a dugout. The Dakotas killed them by being brave warriors." On both counts a circle is shown, which may represent an earthlodge or "dugout." Around the inside of this circle are several representations of heads. On the High Dog count, nine of these are shown, and on the Swift Dog count, eight. The heads have the "enemy" hairdress used by the Dakota to represent Crow, Assiniboin, Arikara, etc. The Swift Dog count has the arabic numeral "8" written inside the circle in addition.

1805–06

Blue Thunder: "Eight Tetons killed by Kangi wicasa [Crow men, JH]." No Two Horns: "The Sioux killed many enemies too." Blue Thunder Variants I, II, and III: "8 Tetons killed by Crows." On the above counts the heads and shoulders of several men are shown, all depicted with wounds on their bodies. The Blue Thunder count shows eight men. No Two Horns shows one man, but eight wounds. Blue Thunder Variant I shows seven men, Blue Thunder Variant II shows six, and Blue Thunder Variant III shows eight. The Flame, Lone Dog, Swan, Good, White-Cow-Killer, Mato Sapa, and Bush counts all give the same event for this year (Mallery, 1886, p. 105). High Hawk gives the event for "1806" (Curtis, 1908, p. 171). White Bull gives it for "1822" (Vestal, 1934 a, p. 263).

High Dog: "The Crows attacked the Sioux in camp. The battle was long and well fought, but as the Crows were mounted two on a horse while the Sioux had not this disadvantage, they won out. Many killed." The Dakota text reads simply "Nam wicako gipapi (*Num wičákaġuġapi* lit. Two they-cracked-their-skulls)." Swift Dog: "A Sioux killed two Crow Indians who were riding double. He got the name of 'Kill Two Mounted.'" Both of the last two counts show two men with the "enemy" hairdress hanging from a horse. Their position probably indicates death.

1806–07

Blue Thunder: "Sihasapa Tetons went out into hills. Crow Indian attacked and killed him." No Two Horns: "A scout on a hill in winter time. When we got there he was dead." Blue Thunder Variants I, II, and III: "Blackfoot [a member of the Sihasapa or Blackfoot band of the Teton Dakota, JH.] killed by Crows on a hill." The above counts all show a man, wearing the white capote commonly used by Dakota scouts, lying on top of a hill or bluff. On the body is the representation of a wound.

The pictograph used for this year and the man's position on a hill make one suspicious that the interpretation given is a late, and incorrect one, supplied in place of the forgotten original. The Swan, Lone Dog, Flame, White-Cow-Killer, Mato Sapa, Bush, and Good counts all state that the man was an eagle trapper (either Dakota or Arikara) who was killed in his pit (Mallery, 1886, p. 105). He may well have been a Dakota, as it is now known that the Dakota formerly practiced ritualized eagle trapping of the sort customary with the Mandan, Hidatsa, and Arikara (Howard, 1954).

It seems likely that the interpretation for this year's pictograph may have been changed on the Blue Thunder, No Two Horns, and Blue Thunder Variant counts at a time when the Dakota no longer practiced eagle trapping to any extent, and could therefore account for the man's presence on the hill only by making him a scout. The man is identified as an eagle trapper on the High Hawk count (Curtis, 1908, p. 171) as well as for the year "1807," and by White Bull (Vestal, 1934 a, p. 263) for the year "1823." Big Missouri gives "This year a Crow Indian sneaked into a Sioux camp and was killed," for the year "1807" (Cohen, 1939, p. 17). This may be related to the Blue Thunder event as well.

High Dog: "In a war with the Crows a leader named Akile Luta [Ógle-lùta, Red-shirt, JH.] was slayn." The Dakota text reads "Akile luta un wan ktepi (*Ógle-lùta un wan ktépi* lit. Shirt-red wearing a they-killed)." Swift Dog: "A Sioux killed a chief by the name of 'Wears Red Coat.' He was the only one who killed an enemy." The last two counts show a man wearing a red coat. See the next year for comparison with other counts having this incident.

1807–08

Blue Thunder: "Crow Indian with red coat killed by the Dakota." No Two Horns: " 'A spectacles' or 'One Eye' was killed that time." Blue Thunder Variants I, II, and III: "Crow, red coat, killed by Sioux." The Blue Thunder count shows a man who is wearing a red coat and is wounded. Blue Thunder Variants I and II show substantially the same. No Two Horns shows a man in a very similar attitude but with an uncolored coat and one eye represented as missing. Blue Thunder Variant III shows a wounded man with an uncolored coat. This seems to indicate that the No Two Horns count was copied from the Blue Thunder Variant III count.

The Flame, Lone Dog, Swan, Mato Sapa, Bush, White-Cow-Killer, and Good counts all give similar events for this year (Mallery, 1886, pp. 105–106). The High Hawk count gives the event for the year "1808" (Curtis, 1908, p. 171). The Flame, Swan, Lone Dog, and Mato Sapa counts state that the man was a Dakota killed by the Arikara. High Hawk, Good, and White-Cow-Killer imply that he was a Dakota, but do not mention his assailant's identity.

High Dog: "A Sioux leader was slayn by the Crows." The Dakota text reads "Tu we yo wan ktepi (*Tonwéya wan ktépi* lit. Scout a they-killed)." Swift Dog: "A Crow Indian killed a Sioux Scout. Afterwards speaking of anything that happened at that time, they say 'When the young scout was killed by a Crow Indian.'" Both counts show a man wearing a green shirt or coat with a yellow stripe over one shoulder and under the opposite arm. The High Dog count represents the man as having been scalped.

1808–09

Blue Thunder: " 'First who got brass rings' went out in hills and got killed at Fort Pierre place." No Two Horns: "First to get brass rings for his hair ornaments." Blue Thunder Variants I, II, and III: "S. [Sioux, JH] W. [with, JH] brass rings on hair got killed (Pierre)." All of the above counts show a man wearing a small feather headdress to which a long strip of leather with brass disks (slides) is attached. This item of adornment was popular among the Dakota during the 19th century, but is rarely seen at present (1957).

High Dog: "The Sioux sent an expert out to find where the buffalo were as they were nearly out of meat. The Crows killed him." The Dakota text reads "Pahata i wan ktepi (lit. On-a-hill went a they-killed)." Swift Dog: "A young man went to look for buffalo and was killed by Crow Indians. His name was 'Saw the Buffalo.'" The last two counts show a man with bison head name symbol above him, indicating that his name was connected with buffalo or that he was looking for buffalo.

1809–10

Blue Thunder: "Blue feathers found in winter time near ocean• Got from birds." No Two Horns: "We found many blue feathers in winter." Blue Thunder Variants I, II, and III: "Found blue feathers by ocean in winter time." All the above counts show a staff ornamented with blue feathers. This staff is distinctly not an Alówanpi wand, but rather resembles the staff used by the Čanté T'inza (Strongheart) warrior society.

High Dog: "The Sioux crossed the Missouri River, and on the east side captured a large number of stray horses, and this gave them a better supply of horses than they had ever had before. . . ." The Dakota text reads "taka suki ku wochiyu wega (*Tóka šúnkakan wodáhiyúwega* (?) lit. Enemy horses other-side-of-the-river (?)." Swift Dog: "The first horse seen and caught was a yellow horse. From that time on the Western Sioux had horses. 'The Man That Saw the First Horse was his name.'" The last two counts show a horse with a lariat falling over its head. The Swift Dog reference to these being the "first horses" seems rather odd considering that three previous years on this count have depicted horses.

1810–11

Blue Thunder: "Two Dakota Fighting each other in camp. Row in camp winter." No Two Horns: "A Dakota and an enemy shot through with arrows fighting." Blue Thunder Variants I, II, and III: "2 S. [Sioux, JH] killed each other." The pictographs show two men fighting, both with arrows in their bodies and representations of wounds. The interpretation of the Blue Thunder count, that they are both Dakota, seems false, as in all but the Blue Thunder Variant I count, one of the men is shown wearing the "enemy" hairdress.

High Dog: "They had smallpox or some such disease which caused great loss of life. This was in the winter." The Dakota text reads "Wicagogo taka (*Wičáḣanḣan tánka* lit. Smallpox big)." Swift Dog: "A young maiden was pouting and wandered away from camp. She was killed by Crow Indians." The last two counts show a human figure, the body and arms of which are spotted, the face not. Since the face is not spotted on either count, one might believe that the person is merely wearing a polka-dot dress or shirt. However the Swift Dog count later uses an almost identical figure to represent smallpox, which seems to indicate that the High Dog interpretation is the correct one.

1811–12

Blue Thunder: "Found white horse with horse shoes on. Montana found it. Northwest of Black Hills that place." No Two Horns: "A man got a white horse with iron shoes on." Blue Thunder Variants I, II, and III: "Found white horse w. [with, JH] shoes (N. W. of B. [Black, JH] Hills)." All of the above counts show a white horse, depicted as being shod. Blue Thunder Variant I shows a horse wearing a bridle as well.

High Dog: "A Whiteman came to live with them. He built a small house. He was a small man and he inclined to stay in his house a good deal so they named him Little Beaver." The Dakota text reads "Capa cigala ti ile (lit. Beaver little house burns)." Swift Dog: "A white man by the name of Little Beaver. Came among the Sioux. He built a house and traded with the Indians." The High Dog and Swift Dog counts show a man, dressed in White man's clothing, who has the name symbol of a beaver above him. He is standing before a log house, the roof of which is in flames. The Dakota text, in connection with the pictographs, is in this instance quite revealing.

The Flame, Lone Dog, Swan, Mato Sapa, Bush, White-Cow-Killer, and Good counts for the year 1809–10 (Mallery, 1886, p. 106), the American Horse count for the year 1808–09 (ibid., p. 135), the Cloud Shield count for the year 1809–10 (ibid., p. 135), and the Big Missouri count for "1810" (Cohen, 1939, p. 17) all refer to a man named Little Beaver being *burned* in his house. Good states that this man was an English trader (Mallery, 1886, p. 106), but the Swan (ibid.,

p. 106) and Big Missouri (Cohen, 1939, p. 17) identify him as a Frenchman. The author feels that he may have been a French Canadian trader in English employ, a common situation for the period. White Bull gives the year "1826" as "They Burn a Small Beaver Lodge" (Vestal, 1934 a, p. 264). This probably refers to the event as well.

1812–13

Blue Thunder: " 'Little Bear,' a Tetonwanna [Teton, JH], killed by Gros Ventres." No Two Horns: "Sioux named Little Bear got killed by enemy people." Blue Thunder Variants I, II, and III: "Little Bear, Teton, killed by Gros Ventres." Blue Thunder, No Two Horns, and the Blue Thunder Variants II and III show a wounded man with the name symbol of a bear above him. Blue Thunder Variant I shows the upright figure of a bear with a wound in its side, obviously to carry the same idea. White Bull gives the year "1829" as the year "Little Bear" was killed (Vestal, 1934 a, p. 264).

High Dog: "The Sioux were camping easterly from and at the Black Hills. The Crows attacked them and were beaten off with 1 man left dead." The Dakota text reads "8 ahi wicaktepi (lit. Eight came they-killed)." Swift Dog: "Ten Crow Indians on a warpath and the Sioux killed 8 of them. That was used as 'The time 8 Crows were killed.' " Both the High Dog and Swift Dog counts show a circle with heads around the inside, as for the year 1804–05. The heads are depicted with the "enemy" hairdress. High Dog shows eight heads, Swift Dog only seven. The Swift Dog count, however, indicates the correct number by having the arabic numeral "8" drawn in the center of the circle. This may possibly correlate with the Blue Thunder group for the following year, although the number killed is different. The Flame, Lone Dog, Swan, Mato Sapa, and Bush counts give similar pictures, but the number killed in these counts is much higher, varying from 20 to 27 (Mallery, 1886, pp. 107–108). Identification of those killed also varies. The Flame calls them Mandan; Lone Dog, The Swan, Mato Sapa, and Bush call them "Gros Ventres" (ibid., pp. 107–108).

1813–14

Blue Thunder: "The Tetons going to war found the Crows and killed three on each side. Call it 'Killed six Winter.' " No Two Horns: "Killed six winter." Blue Thunder Variants I, II, and III: "Six Crows and Tetons killed in a fight." Blue Thunder and Blue Thunder Variants I, II, and III show six wounded men. The "enemy" hairdress is not in evidence. No Two Horns, following his customary manner of abbreviation, shows only one man, but five additional wounds.

Battiste Good gives this year as "Killed Six Pawnees" (Mallery, 1893, p. 316). White Bull gives the year "1830" as "Six Rees were killed" (Vestal, 1934 a, p. 264). High Hawk gives "Six Palani Killed" for the year "1814" (Curtis, 1908, p. 172). Since the words for Pawnee and Arikara are the same in Dakota it may be that the "Pawnees" mentioned by Good were actually Arikara.

High Dog: "The Sioux fought with the Crows and Little Bear, the leader was killed. . . ." The Dakota text reads "Mato cigala ahi ktepi kin (lit. Bear little they-came-and killed)." Swift Dog: "Little Bear was killed by Crow Indian." The last two counts show a man with the name symbol of a bear. He is represented as having been scalped in the High Dog count. This event probably corresponds with the Blue Thunder group event for the year 1812–13.

1814–15

Blue Thunder: "Teton and Gros Ventre go to war, Gros Ventre attached [sic, JH] and Teton got shot in the jaw." No Two Horns: "A man of ours got shot in the jaw." Blue Thunder Variants I, II, and III: "Battle with Gros Ventres & many wounded in jaw, below Yates." All of the above counts show a man with a face wound.

High Dog: "A Crow Indian by the name of Little Bear (called also Uta or Wayuta) came to camp on a pretense of friendship with a member of the tribe, and was slayn with a buffalo bone." The Dakota text reads, however, "Wita pahato an wan kogugapi (*Wítapahà to un wan kağúġapi* lit. Kiowa blue wearing a they-clubbed-him-on-the-skull)." Swift Dog: "A Sioux killed a Crow Indian on a high butte on Many Island." Both counts show a man with the "enemy" hairdress being slain from behind by a man with a club. The two English interpretations are quite obviously incorrect. The author has noticed that the names for other Indian tribes are used very loosely by present-day Dakota, if not, indeed, completely forgotten. In the case of the Swift Dog count the Dakota informants were unable to translate the name of the Kiowa tribe, so merely substituted words having a similar sound. It is very possible that the "to" which I have translated as "blue" is actually only the last syllable of the word for the tribe, as neither High Dog nor Swift Dog shows the man wearing a blue (or a green) shirt. Riggs (1890, p. 579) gives *Wítapaha* as the full name of the tribe, however, and Williamson (1908, p. 95) does the same.

The Flame, Lone Dog, Swan, Mato Sapa, and Bush counts mention this event for the year 1814–15 (Mallery, 1886, pp. 108–109). Good (Mallery, 1893, p. 316), American Horse (Mallery, 1886, p. 135), and White-Cow-Killer (ibid., p. 135) mention it for this year as well. High Hawk (Curtis, 1908, p. 172) and Big Missouri (Cohen, 1939, p. 17) both give the event for the year "1815." White Bull gives it for "1831" (Vestal, 1934 a, p. 264). The Flame identifies the man as a Brule [Sičáŋġu band of the Teton Dakota, JH] and says that he was killed by the Ute (Mallery, 1886, p. 108). Lone Dog says that the man was an Arapaho (ibid., p. 109). The other counts cited by Mallery do not specify the man's tribe but merely spell out the native term (ibid., p. 109). Vestal connects the man with the "We-ta-piu" band of the Cheyenne (Vestal, 1934 a, p. 264). Good (Mallery, 1893, p. 316), American Horse (Mallery, 1886, p. 135), White-Cow-Killer (ibid., p. 135), and High Hawk (Curtis, 1908, p. 172) identify him as a Kiowa. Big Missouri does not identify the man's tribe.

1815–16

Blue Thunder: "Crow war party came to fight with the Tetons. A Dakota warrior knocked down two Crows with a club. No Two Horns: "We got attacked and one man struck two enemies with a club." Blue Thunder Variants I, II, and III: "Crows on horses, battle Tetons. Knock two with clubs." All of the above counts show a man with a name symbol consisting of the heads of two men, both of which are wearing the "enemy" hairdress.

High Dog: "A Sioux stole a horse from another Sioux, and was punished by being . . . bored with an awl in the left jaw. . . ." The Dakota text reads "Wamanu wan cehupa wawegopi (lit. Thief a jaw they-broke)." Swift Dog: "Brave Soldier killed a Crow Indian who came to steal horses. Brave Soldier broke his jaw and killed him." The last two counts show a man with a wound in his face. Possibly these two counts are related to the counts of the Blue Thunder group for the year 1814–15.

1816–17

Blue Thunder: "We killed a white buffalo winter. Out in Montana. Stampede." No Two Horns: "We killed a white buffalo winter." Blue Thunder Variants I, II, and III: "Killed White Buffalo (Montana) winter." The above counts show a white buffalo with an arrow sticking from a wound in his back.

High Dog: Beede gives a long and improbable interpretation for this year, stating that Dakota told him that in a battle with the Crow the Dakota used hoops ornamented with horsehair as signal flags. The true meaning of this year's pictograph is revealed by the Dakota text. This reads "Nampa wakte akili (*Nonpa wakte agli* lit. Two kills (scalps or honors) they-brought-home)." Swift Dog: "The Sioux and Crows made peace. The pipe of peace was never broken." The English interpretations for both counts are apparently quite false.

The pictographs show a man or woman carrying sticks upon which two scalps are fastened.

1817–18

Blue Thunder: "Near mouth of Missouri river we found strange birds. Lots. They were blue feathers and red heads." No Two Horns: "Away off somewhere, we saw some strange redheaded birds." Blue Thunder Variants I, II, and III: "Near ocean in winter saw birds with blue feathers and red heads fly in wind (sand (?))." The counts given above show representations of large birds with blue bodies and red heads. Could these have been whooping cranes?

High Dog: "A chief's son by the name of Buffalo Bull died. . . ." Beede's additional description suggests that the "spirit keeping" or Wanáǧi típi ceremony is referred to. The Dakota text reads "heco Ti taka awakicaga." The author has been unable to secure a good translation of this phrase. "Ti taka" is apparently ti-tánka, a large dwelling. Mrs. Eva Little-chief suggested that the phrase might mean "No-horns, they danced for his house." Frank Zahn translated the phrase as "*Heča šun ti-tánka awákičàga* lit. Junk (grass, leaves, and branches) lodge big they-put-around." Swift Dog: "A council lodge where a buffalo head is painted on the wall." Both counts show a man with a calumet in his hand. The Dakota text indicates that the event may be the same as that of the Flame, Lone Dog, Swan, Mato Sapa, Bush, and Good counts for the year 1815–16, which mention that the Sans Arcs built a large earth lodge, or lodges, on Peoria bottom (Mallery, 1886, p. 109). American Horse and Cloud Shield mention what is probably the same event for this year (ibid., p. 136). Curtis gives this event for the year "1816" (Curtis, 1908, p. 172). White Bull gives it for "1832" (Vestal, 1934 a, p. 264).

Robinson, in the Wi iyohi magazine, cites a local tradition for the Peoria bottom area to the effect that this locality was called "Tee tanka ohe (Ti tanka oe)" (Robinson, 1951, p. 3). This may be the location of the earth lodge, or lodges, mentioned in these counts.

1818–19

Blue Thunder: "Big small pox just for children, out where Bear Butte is." No Two Horns: "Small pox sickness again." Blue Thunder Variants I, II, and III: "Smallpox (children) Bear Butte many die." On all of the above counts a man whose face and body are covered with spots is shown. The Flame, Lone Dog, Swan, Mato Sapa, Bush, Good, Cloud Shield, and White-Cow-Killer counts all give similar events for this year (Mallery, 1886, pp. 109–110). High Hawk mentions this for the year "1819" (Curtis, 1908, p. 172). Big Missouri mentions it for "1819" as well (Cohen, 1939, p. 17).

It seems probable that the disease was not smallpox but rather measles or some other less virulent disease. The Flame calls it "cholera" (Mallery, 1886, p. 109). Lone Dog, Mato Sapa, Bush, and The Swan call it measles (ibid., p. 110). White-Cow-Killer indicates a less virulent disease by calling it "Little Smallpox Winter" (ibid., p. 110). The Good and Cloud Shield counts merely mention a smallpox epidemic (ibid., p. 110). Big Missouri calls it smallpox as well (Cohen, 1939, p. 17). High Hawk calls it measles (Curtis, 1908, p. 172).

High Dog: "There was a great windstorm in the Wintertime which blew the winter camp to pieces." The Dakota text reads "Maka wablu wanitipi (lit. Earth blows wintercamp)." Swift Dog: "The lodge was out of sight owing to very much snow that winter, and many starved to death. . . ." The last two counts show a tipi with many stakes around the edge, indicating a severe windstorm.

1819–20

Blue Thunder: "Saw first soldiers this winter. A white man called 'Choze' (Joseph) built a house of dry logs . . . Lower Grand River." No Two Horns: " 'Choze' built the first house of dry logs along the Missouri." Blue Thunder Variants I, II, and III: "Saw first soldiers, They left and one stayed and built a house. Chose (Lower Grand River) Later built a store." High Dog: "A Whiteman by the name of Joseph came among them and built himself a log house." The Dakota text reads "Josepih chan bulu tikaga (*Jóseph čan pun-púnla un tikága* lit. Joseph wood rotten using built-a-house)." Swift Dog: "A trader by the name of Joseph who built a house out of old logs so he was named 'The Trader that built a bad house.' "

All the above counts show a white man standing near a log house. The Blue Thunder Variant I count represents him as wearing a beard. The Flame, Lone Dog, Swan, Mato Sapa, Bush, Good, and White-Cow-Killer counts mention this or a very similar incident for this year (Mallery, 1886, p. 110). High Hawk gives the event for the year "1820" (Curtis, 1908, p. 172). Big Missouri mentions it for "1820" as well (Cohen, 1939, p. 17). Lone Dog, Mato Sapa, and Bush identify the man as Louis La Conte (Mallery, 1886, p. 110). Good identifies him only as "Choze" (ibid., p. 110).

1820–21

Blue Thunder: "Going to camp that time on Cherry Creek place many Crow Birds flew around tipis and died, lean and starved. So cold they fell dead out of the skies." No Two Horns: "Cold. The Crows tried to look into the lodges for a place to stay." Blue Thunder Variants I, II, and III: "Camped on Cherry Creek. Lots of

Crows died there." The above counts show a tipi with a black bird above it.

High Dog: "The Sioux in this summer celebrated for the first time in their history the sun dance." The Dakota text reads "*Wi iháblo iyéwači kin* (lit. Sun dreamed-of while-dancing the)." Swift Dog: "An old man offering to the Great Spirit for lots of game and health. He offered to a pole planted with a red cloth tied to the top."

The pictographs on both counts are the same. They show a man beside a pole which is apparently a sun dance pole. The Flame, Lone Dog, Swan, Mato Sapa, Bush, White-Cow-Killer, and Good counts all seem to suggest some sort of ceremony or ceremonial activity for this year, but are vague as to details, and do not agree with one another (Mallery, 1886, p. 110–111).

1821–22

Blue Thunder: "In Montana. Three Buttes going for Winter. Big Star went along making a great noise." No Two Horns "A big star gave a loud voice signal from the air." Blue Thunder Variants I, II, and III: "In Marten (The Butte) Big Star fell while it was thundering. Location uncertain." The Dakota text reads "Wicagipi wan hatu hiyaya (*Wičánhpi wan hóton hiyáye* lit. Star a sounding came-by)". All of the above counts show a representation of a star with a trail of smoke or fire. The Swan, Lone Dog, Flame, Mato Sapa, Bush, White-Cow-Killer, Good, and Cloud Shield counts mention this event as well (Mallery, 1886, pp. 111, 136). White Bull gives this event for "1833." [3] High Dog gives it for the year "1822" (Curtis, 1908, p. 172).

1822–23

Blue Thunder: "Three Gros Ventre going in canoe on river. Tetons attack and kill all. Where Fort Yates is now." No Two Horns: "Killed three enemies in a boat on the Missouri." Blue Thunder Variants I, II, and III: "Three Gros Ventres killed by Tetons (Yates)." For this year the above counts show three men, depicted as wounded, who are paddling a boat, or, in the case of No Two Horns, only one man but three wound symbols, two of them apparently suspended in midair. In the Blue Thunder, No Two Horns, and Blue Thunder Variant III counts the men are wearing the "enemy" hairdress. In Blue Thunder Variants I and II they are wearing the roach headdresses usually used to indicate Omaha or Ponca.

---

[3] Vestal, 1934 a, p. 264. With this event the other counts "catch up" with White Bull, a fact which seems to indicate that a hiatus is present here, and that White Bull's events up to this date, while in correct order, are incorrect chronologically.

High Dog: "A leader named Dog Ghost went out hunting and froze to death." The Dakota text reads "Sunkawan a gi cuwitata (*Šúnka-wanàği čuwíta t'a* lit. Dog-ghost cold he-died)." Swift Dog: "A chief named 'Dog Ghost' froze to death." The last two counts show a man with a dog as his name symbol. According to Frank Zahn, this man was "Grey Earth's" son.

1823–24

Blue Thunder: "Found a lot of dry corn toward Omaha country. Found it in a field. White people stole it from Sihasapa." No Two Horns "Lived on dried corn winter. . . ." Blue Thunder Variants I, II, and III: "Whites state, Found a lot of dry corn down towards Omaha country, Tetons (Blackfoot) raised it. . . ." High Dog: "The Sioux went away to war with the Crows, and some White men stole their corn while they were away. . . ." The Dakota text reads "Wahu wapa seco ir api (*Wahúwapa šéča ihápi* lit. Corn dried they-buried)." Swift Dog: "The year the corn crop was plenty, the Great Spirit blessed the tribe." Jaw Variant: (Beginning picture on this count corresponds with this date. There is no interpretation accompanying this count. The count has been included with the interpretation of the Jaw count at the place where the interpretation of the Jaw count begins.)

The Blue Thunder, No Two Horns, and Blue Thunder Variant counts I, II, and III show two stalks of corn for this year. The High Dog and Swift Dog counts show one stalk of corn. The Jaw Variant count shows an Indian man taking an ear of corn from one of two cornstalks. He carries a third cornstalk on his shoulder.

Good (Mallery, 1886, p. 112), American Horse (ibid., p. 137), and White-Cow-Killer (ibid., p. 112) also mention corn in connection with this year. From the description accompanying the Lone Dog count for this year, it appears likely that the corn was taken from the Arikara when a joint force of United States troops and Dakota attacked the Arikara village on November 29, 1823 (Mallery, 1886, pp. 111–112). Big Missouri, however, gives "This year a certain white man raised a fine field of corn. The winter was so severe and the Indians camped near the field and the white man gave his corn to them for food," for the year "1824" (Cohen, 1939, p. 17).

1824–25

Blue Thunder: "Corral fence. Went out north of where Bismarck is now. Found a Chippewa fence. Attacked them. Gave them hell. Tore fence down. Corn hills there. This fence was on creek there, this side of Turtle Mountains." No Two Horns: "Threw stones and arrows through a fence at the enemy." Blue Thunder Variants I, II, and III: "Wiciyela (Dakota) attacked Chippewa at South of

Turtle M. [Mountains, JH] at Can Hill, Chippewas were fortified. We beat them awfully. Two tore fence down."

The above counts all show some sort of a diagram or drawing of the "Chippewa" (probably these people were Plains-Ojibwa rather than Ojibwa) stockade. The Blue Thunder and Blue Thunder Variant III counts show the stockade as a rectangle, in a bird's-eye view. The Blue Thunder Variant counts I and II show it as a rectangle inside a circle, also as it would appear from above. No Two Horns shows the stockade as rectangular in a view from the side and slightly above, using perspective. This is the only use of perspective on a Dakota winter count known to the writer.

High Dog: "They have a ceremony of anointing a buffalo horn with clay and hanging it near the camp so as to make the buffalo come. . . ." The Dakota text reads "Pte wan sayapi (*Pte* (*hc* ?) *wan sányapi* lit. Buffalo (actually "cow" but used here in a generic sense) (horn ?) a they-paint-a-cream-color)." Swift Dog: "A chief named 'One Feather' was killed by Crow Indians." Jaw Variant: No Interpretation.

The High Dog, Swift Dog, and Jaw Variant counts all show a representation of a buffalo horn. This is white on the High Dog and Swift Dog counts but black on the Jaw Variant count. The person who made the Swift Dog interpretation apparently mistook the bison horn for a feather.

1825–26

Blue Thunder: "Wintering near Gayton's place and came a great flood. Nearly all drowned. These were Wiciyela. Dead Horse Head Point. That's where it was." No Two Horns: "Many people drowned when river came up fast. Missouri River at Dead Horse Point." Blue Thunder Variants I, II, and III: "Wintering by Horse Head Hill, Most all drowned (Wicejela)." High Dog: "They were camping on the bottom by the Missouri River, and a sudden and unprecedented rise of water in the early spring drowned over one half of the tribe." The Dakota text reads "*Miní wičáta* (lit. Water they-died)." Swift Dog: "The winter without snow, but lots of wind and dust." Jaw Variant: No interpretation.

The Blue Thunder, No Two Horns, and Blue Thunder Variant counts I, II, and III show several human heads above what is probably intended to represent a body of water. The High Dog and Swift Dog counts show three human heads inside a tipi. The Jaw Variant count shows a blue patch, probably intended to represent water, with human heads beneath the surface.

The Flame, Swan, Lone Dog, Mato Sapa, Bush, Good, American Horse, White-Cow-Killer, and Cloud Shield counts all give the same event for this year (Mallery, 1886, p. 113). High Hawk mentions this event for "1826" (Curtis, 1908, p. 173). Big Missouri gives it for "1826" also (Cohen, 1939, p. 17).

1826–27

Blue Thunder: "'Corn Feather' goes to war alone. Omaha attacked and killed many. Staff is emblem of victory. Brought back scalps." No Two Horns: "'Garden' a Sioux brought home the scalp of an enemy." Blue Thunder Variants I, II, and III: "Man called 'Corn Father' attacked Omahas & he killed a lot of them." High Dog: "A famous chief named Corn Stalk went with a party against the Crows and returned with scalps." The Dakota text reads "Magala waktekili (*Maġála waktegli* lit. Little-goose (or possibly *mágala*, Little-garden) killed-brought-home). Swift Dog: "Young man, Goose Feather, killed a Crow Indian and brought the scalp home and had a war dance where women danced with the scalp." Jaw Variant: No interpretation.

All of the above counts show a man with the name symbol of a cornstalk holding a stick to which a scalp is attached. On the Blue Thunder Variant I count the man carries a rifle in the other hand and is wearing a powder horn. On the Blue Thunder count, and on Blue Thunder Variant counts I, II, and III he has his hair tied up in a round topknot, a style which is said to have been worn by a Dakota war leader who was also a shaman. On Blue Thunder Variant counts I and II he is also painted in a special manner, having serpentine lines down the side of his face and neck and down the sides of his legs. The topknot shown in these counts is different from the hairdress used to designate enemies in other year's pictographs.

1827–28

Blue Thunder: "Winter time and Isantees [Santee group of the Dakota, embracing the Mdewakanton, Wahpeton, Wahpekute, and Sisseton bands of the Dakota tribe, JH] starving. They kill each other and eat each other that time. In Sisseton place, Nebraska. Two men killed, boiled in kettle and eaten up." No Two Horns: "Starvation winter time. The Isantee ate two of their own people." Blue Thunder Variants I, II, and III: "In winter Santees staying in Nebraska, & killed and ate each other." The above counts show a tipi with two people sitting around a kettle, which is suspended from a pothook.

High Dog: "For the first time they used snowshoes in hunting buffalo." The Dakota text reads "Wasima Pisa ohanpi (*Wášma psa-óhanpi* lit. Deep-snow snowshoes)." Swift Dog: "Much snow, where snowshoes were used." Jaw Variant: No interpretation.

The last three counts show a representation of a snowshoe. The High Dog and Swift Dog counts show it as seen from above, the Jaw Variant as seen from the side. On all three counts the snowshoe is quite stylized and resembles a snowshoe only vaguely. White-Cow-Killer calls this "Snow-Shoe-Making-Winter. (Mallery, 1886, p. 138). Good calls it, "Wore snowshoes winter" (ibid., 1893, p. 318). High Hawk mentions the use of snowshoes for the year "1827" (Curtis, 1908, p. 173).

1828–29

Blue Thunder: "White man, more River camping, this winter. White man built dry log house. Called 'Red Breast' or 'Red Shirt.' " No Two Horns: " 'Red Breast' built a dry log house. Was a white man." Blue Thunder Variants I, II, and III: "White man at Moreau River came [cave? JH] They called him Red Breast." All the above counts show a man wearing a dark blue coat over a red shirt. He stands before the door of a log cabin.

The Flame, Lone Dog, Swan, Mato Sapa, and Bush counts mention this event as well (Mallery, 1886, p. 114). The Flame, Lone Dog, Mato Sapa, and Bush counts identify the man as Chardran or Shardran (ibid., 1886, p. 114). The Flame locates this house near the forks of the Cheyenne (ibid., 1886, p. 114). All of the counts given by Mallery identify the house as a "dirt lodge" rather than as a dry log house (ibid., 1886, p. 114).

High Dog: "They passed the winter by Bear Butte, near the Black Hills." The Dakota text reads "Mato Paha el wanitipi (lit. Bear Butte at they-camped-for-the-winter)." Swift Dog: "At the Black Hills, that's the highest butte there. The Indians called it Bear's Butte." Jaw Variant: No interpretation. The High Dog and Swift Dog counts show a very steep-sided butte, covered with trees, with a bear standing on the summit. The Jaw Variant count shows a hill with a cave in the side of it and a tipi on each side of it.

1829–30

Blue Thunder: "Padani (Arikara) Killed by Yanktonaise, Standing Rock place. Had a hat of willows and a red shirt." No Two Horns: "We took a robe away from a White man that winter count." Blue Thunder Variants I, II, and III: "Ree killed by Sioux at F. Y [Fort Yates, JH]." The above counts show a man in White man's clothing. His shirt is red and he is wearing a black broad-brimmed hat. In the Blue Thunder count he is apparently represented as wearing a breechcloth over his trousers, indicating that he is an Indian.

High Dog: "A man looking for buffalo was found on the prairie shot and frozen. He is called Froze-on-the-Prairie . . . ." The

Dakota text reads "Wata sakiyapi (lit. Froze-buffalo-meat-for-the-winter)." Swift Dog: "Chief Paints Himself Yellow was killed by a Crow Indian." Jaw Variant: No interpretation. The High Dog and Swift Dog counts show a man with a wound on his body. The Jaw Variant count shows a man who has been scalped.

1830–31

Blue Thunder: " 'Wo-na-re' made one of the Ruling class." No Two Horns: "Many ceremonies winter." Blue Thunder Variants I, II, and III " 'Wo-na-se' was made one of the ruling class." All of the above counts show what is apparently a representation of one of the wands used in the Hunká or Alówanpi ceremony. "Wo-na-se" is probably the man who was honored by being ceremonially "adopted" in the ceremony. His name was probably Wanáse or "Buffalo-hunter."

High Dog: "A battle with the Crows, and many were slayn." The Dakota text reads "Kagi wicasa 8 wicaktepi (*Kangí wičása sahlógan wičáktepi* lit. Crow men eight they-killed)." Swift Dog: "Eight Rees killed by the Sioux." Jaw Variant: No interpretation. The High Dog and Swift Dog counts show a circle with small heads around the inside. The heads are shown wearing the "enemy" hairdress. The High Dog count shows eight heads, the Swift Dog count only six. The Jaw Variant count shows one head, which is represented as being scalped and is wearing the enemy hairdress. For pictographic purposes, evidently, the hairdress is left to identify the man as an enemy. Actually, the process of scalping would undoubtedly remove this forelock. Beneath the man's head are 10 vertical marks, in two rows of 5 each, apparently to indicate the number of men killed. Near the head is what appears to be a coup stick with an eagle feather attached to one end.

1831–32

Blue Thunder: "Below Fort Yates place north of Grand River. Palani had village—a double one. Soldiers and Dakota attacked the village. Eight Dakota killed. Soldier, French, and Dakota." No Two Horns: "Killed eight enemies winter." Blue Thunder Variants I, II, and III: "Below F. Y. [Fort Yates, JH] near G. [Grand, JH] River was a big village of G. [Gros Ventres, JH] R. [Rees, JH] and M. [Mandan, JH] French W. [with JH] arms and Sioux attacked village and 2 S. [Sioux, JH] killed (1831). The Blue Thunder count and Blue Thunder Variants I, II, and III show eight men with wounds on their bodies. They are not shown wearing the "enemy" hairdress. No Two Horns shows one man but eight wounds. He also does not picture the man as wearing the "enemy" hairdress.

High Dog: "Brown, a Whiteman shot and killed an Indian, being jealous on account of his wife." The Dakota text reads "Istazi kaskapi (lit. Yellow-eyes imprisoned)." Swift Dog: "A white man by the name of Yellow Eyes came to trade with the Sioux." Jaw Variant: No interpretation and no pictograph for this year. The next picture on this count corresponds with that given on the High Dog and Swift Dog counts for the following year. This is apparently an accidental hiatus. The High Dog and Swift Dog counts for this year show a white man who is apparently wearing handcuffs.[4] The Flame, Lone Dog, Mato Sapa, Bush, and Swan counts all mention a murder committed by a white man for this year (Mallery, 1886, p. 115). Lone Dog, Mato Sapa, Bush, and the Swan identify the man as Le Beau, a trader (ibid., 1886, p. 115). Vestal gives the year "1831" as the year of " 'Yellow Eyes' accident," on his Hunkpapa count (Vestal, 1934 b, p. 348)

1832–33

Blue Thunder: "Called 'Broken Leg' found whiskey. Drank all. Died then." No Two Horns: " 'Broken Leg' found some whiskey Drank it. Died." Blue Thunder Variants I, II, and III: "Broken Leg' S. [Sioux, JH] find whiskey, drink and died Below Totten." The above counts show a man with his leg missing below the knee drinking from a bottle and apparently vomiting up what he has drunk.

The Flame, Lone Dog, Swan, Mato Sapa, Bush, White-Cow-Killer, and Good counts all refer to a man with a broken or stiff leg, but do not mention whiskey (Mallery, 1886, p. 115). Good's count says that he was killed by a Pawnee (ibid., 1886, p. 115). High Hawk mentions a chief being killed for the year "1833" (Curtis, 1908, p. 174).

High Dog: "A log house was built by an Indian for the first time." The Dakota text reads "Titaka oblecakagapi (*Ti-tánka obléča káġapi*) lit. Lodge-big gable-roofed they-built." Swift Dog: "The first dance house built by the Indians with logs. Jaw Variant: No interpretation.

The High Dog and Swift Dog counts show a representation of a log house with a gabled roof. The Jaw Variant count shows what appears to be a round earth lodge. White-Bull gives the year "1832" as "The Sans Arc First live in Log Houses" (Vestal, 1934 a, p. 264). The author has elected to place this event with the High Dog and Swift Dog counts for the year 1817–18. However, it might better be placed here. The White Bull count has an apparent hiatus either before or after this year. Vestal's Hunkpapa count gives the log house event for the year "1832," and in this case there is no question as to its provenience (ibid., 1934 b, p. 348).

---

[4] Beede believed that the man's hands had been cut off.

1833–34

Blue Thunder: "Camping across river for that winter. Stars flew around like bird. Many stars with great noise. Changed places winter." No Two Horns "The stars all changed around in the sky." Blue Thunder Variants I, II, and III: "Camping across River and Many stars fell w. [with, JH] noise a few on earth." High Dog: "This year is named 'Stars-all-moveing-Year' the falling of the stars in this year is said to have caused great consternation; They feared Great Spirit had lost his control over the creation." The Dakota text reads "Wicagipi akicamina (*Wičánȟpi okečámna* lit. Stars shower-down)." Swift Dog "In the fall of the year when the trees shed their leaves, the stars floated all over the heavens. . . . ." Jaw Variant: No interpretation.

All of the above counts show a group of stars except the Jaw Variant count, which shows only one large star. The Blue Thunder count and Blue Thunder Variants II and III represent the stars as four pointed, which seems to be the aboriginal manner of picturing stars. The Blue Thunder Variant I count has both four-pointed and five-pointed stars. No Two Horns, High Dog, Swift Dog, and the Jaw Variant count show the stars as five pointed.

The Flame, Lone Dog, Swan, Mato Sapa, Bush, White-Cow-Killer, American Horse, Cloud Shield, and Good counts all mention this event (Mallery, 1886, pp. 116–138). High Hawk's count records the event for the year "1834" (Curtis, 1908, p. 174). Big Missouri gives it for "1834" as well (Cohen, 1939, p. 18). White Bull records the event for the year "1833" (Vestal, 1934 a, p. 264). Vestal's Hunkpapa count records it for "1833" also (ibid., 1934 b, p. 348).

All counts apparently refer to the "star shower" which was observable throughout North America shortly before daylight, November 12, 1833 (Mallery, 1886, pp. 138–139). This event is noted on the Kiowa winter count collected by Mooney (Mooney, 1898, pp. 260–261) and on several Pima counting sticks (Russell, 1908, p. 38). Foolish Woman, a Mandan, gives the year "1835" as "Shooting Stars fell during the summer" on his winter count (Beckwith, 1938, p. 308). Peter Le Claire, a Northern Ponca Indian who is much interested in the history of his tribe, stated that this event was well known to his people and was included in the now lost Ponca winter count.[5]

1834–35

Blue Thunder: "Wintering camp on Heart River. Found bear there too. Stayed in our lodges. Call it 'Wintered with wild bear place winter.'" No Two Horns: "We camped for winter on the Heart River. A black bear stayed with us all winter." Blue

---

[5] In a letter to the author, dated March 21, 1951.

Thunder Variants I, II, and III: "Wintered on Heart River, Bear wintered with them (not friend)." All of the above counts show a bear and a tipi. In the Blue Thunder Variant I count the bear is drawn outside of and below the tipi. In all others he is shown inside the tent.

High Dog: "The first war bonnet was made with horns on it. . . ." The Dakota text reads "Wapaha hetun kagapi (*Wapáha hétun kágapi* lit. Warbonnet horns-using they-made)." Swift Dog: "The first war bonnet was made and introduced to the tribe." Jaw Variant: No interpretation.

The High Dog and Swift Dog counts show a warbonnet with horns. On the High Dog count this has a red trailer. On the Swift Dog count the trailer is half black and half red. The Jaw Variant count shows a man wearing a horned warbonnet. The pictographs for this year on the High Dog and Swift Dog counts are very similar to those used on the counts of the Blue Thunder group for the year 1836–37. Vestal's Hunkpapa count gives this event for the year "1834" (Vestal, 1934 b, p. 348).

1835–36

Blue Thunder: "Below Mandan on flat. Ree and Mandan village. Sioux, Teton and Blackfeet battle them. Many got shot on both sides. None killed." No Two Horns: "Twelve Sioux were killed by Hohe winter." Blue Thunder Variants I, II, and III: "Below Mandan S. [Sioux, JH] attacked by Rees M. S. [Many Sioux, JH], Killed 9 Tetons and Blackfeet attacked Big Battle." High Dog: "A fight among the Sioux and many killed. . . ." The Dakota text reads "Wiciyela wicakasotapi (lit. Wiciyela they-killed-them-off)." Swift Dog: "Buffalo hunt with dogs and travoises to carry meat home." Jaw Variant: No interpretation.

The Blue Thunder and Blue Thunder Variant counts I, II, and III show 12 wounded men. No Two Horns shows only one man but 12 wound symbols. On the Blue Thunder, No Two Horns, and Blue Thunder Variant III counts the men, or the wound symbols representing them, are arranged in two parallel rows of six each. On the Blue Thunder Variant II count they are arranged in three rows of four each. On the Blue Thunder Variant I count the circle device, commonly used on the High Dog and Swift Dog counts, is employed, with the heads of the slain men shown around the inside of a circle. On none of the counts are the men shown wearing the "enemy" hairdress.

The pictographs for this year on the High Dog and Swift Dog counts are quite puzzling in relation to the written interpretations.

The figure of a man is shown, and nearby a dog pulling a travois. Above the travois are a few small heads, four on the High Dog count, three on the Swift Dog count. Although the Swift Dog explanation would seem to be the more plausible in this case, the author feels that the High Dog interpretation is more nearly correct, as it has been more consistent throughout and as in this case it agrees with the counts of the Blue Thunder group. The Jaw Variant count seems to bear this out. It shows a man who is represented as having been scalped, and who has a coup stick by his head. Perhaps the travois in the High Dog and Swift Dog counts represents the litters used to bring back the dead and wounded from the battle. Vestal's Hunkpapa count gives "Yanktonais Sioux almost wiped out in winter," for the year "1835" (Vestal, 1934 b, p. 348).

1836–37

Blue Thunder: "Grand River winter camp place. Nothing special. Peaceful winter. Made many feather bonnets in winter time." No Two Horns: "A man got a headdress with horns on it winter." Blue Thunder Variants I, II, and III: "Grand River, Wicijela had powerful winter." All of the above counts show a feather warbonnet with horns and a long black and red feathered trailer. This pictograph seems definitely related to that used on the High Dog and Swift Dog counts for the year 1834–35.

High Dog: "Six Crow chiefs were killed by the Sioux." The Dakota text reads "Palani 6 wicaktepi (lit. Arikara (or Pawnee) six they-killed)." Swift Dog: "Sioux killed six Rees. The author's oldest brother was born. . . ." Jaw Variant: No interpretation.

The High Dog and Swift Dog counts show a row of six men wearing the "enemy" hairdress. The Jaw Variant count shows two men fighting with bows and arrows. One is wearing the "enemy" hairdress. A heavy blue line is drawn beneath the warriors. This pictograph is repeated on the Jaw Variant count, apparently for clarity, rounding the acute angle formed by the leg of the sheep hide on which it is painted. The pictographs are nearly identical, and it seems obvious that only one year is meant. Perhaps the heavy blue line represents ice, in which case the year's event would correspond with the battle on ice given by the Good (Mallery, 1893, p. 320), American Horse (ibid., 1886, p. 139), Cloud Shield (ibid., 1886, p. 139), and White-Cow-Killer (ibid, 1886, p. 139) counts for this year. High Hawk (Curtis, 1908, p. 174) and Big Missouri (Cohen, 1939, p. 18) give the event for the year "1837." Vestal's Hunkpapa count for the year "1836" (Vestal, 1934 b, p. 348) and White Bull's count for the year "1835" (ibid., 1934 a, p. 264) may also be related.

1837–38

Blue Thunder: "Had a big small pox sickness. No one die much." No Two Horns: "Small pox winter." Blue Thunder Variants I, II, and III: "Smallpox, No one died." High Dog "Smallpox carried off to 'Wanagi yakonpi' [Spirit land, JH] many of the suffering people. . . ." The Dakota text reads simply "Wica gaga (*Wičáȟanȟan* lit. Smallpox)." Swift Dog: "A woman with spots on her face. Smallpox killed many of the tribe." Jaw and Jaw Variant: (This is the beginning year for the Jaw count and the interpretation accompanying it. Since the Jaw Variant count has no accompanying interpretation, the author has placed it with the Jaw count for the years where the two counts are concurrent. Welch calls the opening year of the Jaw count 1847–48, evidently counting back from the event labeled "Capture of Sitting Bull." This event is, however, incorrectly labeled, as has been amply demonstrated by comparing this count with the others. The opening date of the Jaw count is actually 10 years earlier, and the author has accordingly placed the opening event here.) "Big Small pox."

All of the counts show a human figure covered with spots. Vestal's Hunkapapa count correlates with these counts, giving the year "1837" as "*Wičáȟanȟan* Smallpox plague (ibid., 1934 b, p. 348).

1838–39

Blue Thunder: "Found a white buffalo. Killed by 'Poeya.'" No Two Horns "'Grey Day' killed a white buffalo." Blue Thunder Variants I, II, and III: "'P'O'jeje killed white buffalo." The above counts show a white buffalo wounded by an arrow.

High Dog: "The Sioux take many spotted horses from the Crows in a battle." The Dakota text reads "Sunkile ska awicakilipi (*Šungléška awičáglipi* lit. Spotted-horses they-brought-back)." Swift Dog: (Burdick's supposed "Blue Thunder" interpretation, which has been used with this count, ends with this year.) "The young man brought spotted horses to his tribe." Jaw and Jaw Variant: "Brings many horses." The High Dog and Swift Dog counts and the Jaw and Jaw Variant counts all show a spotted horse. Vestal's Hunkpapa count gives the year "1838" as the year when the spotted horses were brought home (ibid., 1934 b, p. 348). It is possible that White Bull's reference to spotted horses for the year "1840" refers to this event as well (ibid., 1934 a, p. 265).

1839–40

Blue Thunder: "Across Fort Yates place. Attacked he was a Chief with spectacles. Man from far away. Suspicious of him. 'He comes attacking.' Went out in night. Got killed. Don't know who did that." No Two Horns: "'Man with spectacles' went out and was killed in the hills." Blue Thunder Variants I, II, and III: "Across from Fort Yates a chief named Waanatoka came. He had spectacles on. Was killed in the night."

All of the above counts show a man wearing gogglelike spectacles. Blue Thunder, No Two Horns, and the Blue Thunder Variant II count show him with two wounds in his body. Blue Thunder Variant III shows him with only one wound, and Blue Thunder Variant I shows him without any wound.

High Dog: "An Indian woman hanged herself 'because her husband was killed'. . . ." The Dakota text, however, reads "Wikite wan icikte kin (*Wínkte wan ičikte kin* lit. Transvestite a suicided the)," Swift Dog: No interpretation. Jaw and Jaw Variant: "Woman kill herself."

"The last four counts show a figure in woman's clothing who has hanged herself (himself) from a tree or a pole. However, in the High Dog and Swift Dog counts a penis is drawn on the "woman" indicating a transvestite. This identification is confirmed by Vestal's Hunkpapa count for the year "1839" which identifies the person as a "hermaphrodite," and states that his name was "Grass" (ibid., 1934 a, p. 348). Vestal's translation of "Winkte" as "hermaphrodite" seems incorrect, and the author suggests transvestite as a better translation.

Vestal's Hunkpapa count's identification of this person as "Grass" explains the item "Grass Killed Himself" which is given for the year "1838" by White Bull (ibid., 1934 a, p. 265). Vestal comments that it was unusual for a man to commit suicide by hanging himself (ibid., 1934 a, p. 265). If the man were a homosexual and/or a transvestite, however, this would not be unusual, as hanging was commonly resorted to by women wishing to commit suicide.

1840–41

Blue Thunder: "Going to battle and found Ree Indian 'His Knife Broad' at mouth of Cannon Ball. Killed him then." No Two Horns: "The knife was full of blood winter." Blue Thunder Variants I, II, and III: "Wicijela going to battle, Found Rees at mouth of C. B. [Cannon Ball, JH] Call him 'His Knife broad.'" The above counts show a knife with a bloody blade.

High Dog: "Elk Spider, a chief was killed by the Crows." The Dakota text reads "Ikitomi heraka ktepa (*Iktómi-heḣáka ktepi* lit. Spider-elk died)." Swift Dog: No interpretation. Jaw and Jaw Variant: "Elk Spider die winter." The last four counts show a man with the name symbol of a spider which has large antlers, like those of an elk. Vestal's Hunkpapa count gives this event for the year "1840" (ibid., 1934 b, p. 348).

1841–42

Blue Thunder: "At Grand River in winter camp. But lots snow. Couldn't use horses. Made snowshoes. Killed lots buffalo. Call that 'They make snowshoes winter.'" No Two Horns: "Big snow winter. People used shoes for snow." Blue Thunder Variants I, II, and III: "At G. R. [Grand River, JH] deep snow so could not use horses for hunting, w. [with, JH] snow-shoes Killed lot buffalo." High Dog "Snowshoes used again." The Dakota text reads "Psa ohanpi (lit. snowshoes)." Swift Dog: No interpretation. Jaw and Jaw Variant: "Snow shoes."

The Blue Thunder, No Two Horns, Blue Thunder Variant counts I, II, and III, and Jaw counts show a man wearing snowshoes. The High Dog, Swift Dog, and Jaw Variant counts show merely a snowshoe. High Dog and Swift Dog show it as it would be seen from above, the Jaw Variant count shows it in a side view. Vestal's Hunkpapa count gives the snowshoe event for the year "1841" (Vestal, 1934 b, p. 348).

1842–43

Blue Thunder: "Man 'Holy Tracks Buffalo' die. Bury him in striped tipi. A big man but not a chief man." No Two Horns: "Buried 'Holy Buffalo Track' in a tipi winter." Blue Thunder Variants I, II, and III: "Buffalo-Holy-Fish died and buried in a striped tent." All of the above counts show a tipi, which is striped horizontally in all but the No Two Horns count. From under the edge of this tipi a bison's foot protrudes. Wavy lines emanate from the hoof of this foot signifying "holy" or "sacred"; in other words "sacred buffalo track." "The 'fish' element in the interpretation used with Blue Thunder Variants I, II, and III is probably incorrect. The drawing of the bison's foot somewhat resembles a fish tail, and the author believes that the person who made this interpretation interpreted the drawing as such.

High Dog: "A chief lost in a battle with the Crows, and supposed to be dead, returned later with a Crow Horse." The Dakota text, however, reads "Hohe spela wanktepi (*Hóhe spéla wan ktepi* lit. Assiniboin deformed a they-killed)." Swift Dog: No interpretation. Jaw and Jaw Variant: "Crow Indian. Scalpned and die." The above counts show a man who has been scalped. On the Jaw and Jaw Variant counts he is shown wearing the "enemy" hairdress. The High Dog and Swift Dog counts, although showing the characteristic forehead hair of the "enemy" hairdress to be missing, indicate, by the remainder of the hairdo, that the man is an enemy. This seems puzzling in that for the other years on the counts a man is often shown to be scalped and yet the hair remains to identify him on the count.

A possible solution is suggested by Vestal's Hunkpapa count for the year "1842"; this count gives "A small Assiniboin killed," and explains that he had previously been scalped but not killed (Vestal, 1934 b, p. 348).

1843–44

BLUE THUNDER: "Camped that winter above Fort Rice place. Almost starving. These Hunkpati [Upper Yanktonai, JH] men have a lodge with a red door. Made a prayer. Asked for the buffalo to come around—They came. Called 'Manliving in a red door winter' or 'Buffalo came with free will winter' First time they had red as a cloth." NO TWO HORNS: "We found a man dead in a tipi with a red door." BLUE THUNDER VARIANTS I, II, III: "Above F. [Fort, JH] Rice Buffalo come to Wicijela when they were most stormy because a holy man prayed, so called him *Re Tiopa Sa Oti Pte-Aku'* (*Le tiópaša oti pte aku* lit. This door scarlet lodge buffalo came (?) JH.)" All of the above counts show a tipi with a round red entrance.

The Flame, Lone Dog, Swan, Mato Sapa, and Bush counts all mention this or a very similar incident for this year (Mallery, 1886, pp. 118–119). White Bull gives the event for the year "1842" (Vestal 1934 a, p. 265). The Flame, Lone Dog, Swan, Mato Sapa, and Bush counts all differ from the counts of the Blue Thunder group in representing the tipi as having a bison head painted on it instead of having a red door (Mallery, 1886, pp. 118–119). The Lone Dog interpretation identifies the shaman as being a member of the Sans Arc (*Itázipčo*) band of the Teton Dakota (ibid, p. 118).

HIGH DOG: "Four Horns a chief went away and never returned." The Dakota text reads "hetopa kilisni (*He-tópa glísni* lit. Horns-four returned-not)." SWIFT DOG: No interpretation. JAW AND JAW VARIANT: "Four Horns die." The last four counts show a man wearing four horns on his head. The same incident is given for the year "1843" in Vestal's Hunkpapa count (Vestal, 1934 b, p. 348). White Bull mentions the event as occurring in "1845" but does not use it in the picture for that year in his count (Vestal, 1934 a, p. 265). He recounts that Four-horns, after having been given up for dead, returned. His relatives, however, had already staged a give-away in his memory, and had given away all of their property (ibid., p. 265);

1844–45

BLUE THUNDER: "All the people they got measles. No one die." NO TWO HORNS: "Measles time." BLUE THUNDER VARIANTS I, II, and III: "Indians all over has measles. None died." HIGH DOG: "Measles. No great mortality." The Dakota text reads "Nawicasli (lit. Measles)." SWIFT DOG: No interpretation. JAW AND JAW VARIANT: "Chicken pox." All of the above counts show a human figure covered with spots. Under this figure on the Blue Thunder Variant III count is written "*Wicaranran* [*Wičáȟanȟan* lit. Smallpox, JH]."

White-Cow-Killer gives the year 1845–46 as "many sick Winter" (Mallery, 1886, p. 141). Good gives a measles epidemic for 1845–46 (ibid., 1893, p. 322). High Hawk gives a measles epidemic for the year "1846" (Curtis, 1908, p. 175). Vestal's Hunkpapa count gives "1844" as "*Nawíčá sli* [measles, JH] Severe skin eruption" (Vestal, 1934 b, p. 348). Foolish Woman's Mandan count gives the year "1846" as that of a chickenpox epidemic (Beckwith, 1938, p. 312).

1845–46

Blue Thunder: "North of Heart River, 'Red Leaf,' Padani shot him in the knee." No Two Horns: "Had a battle and nearly everyone got hit on the legs." Blue Thunder Variants I, II, and III: "(Wicijela) Across H. [Heart, JH] River Rees shot Red Leaf." The above counts show a man who is wounded below the knee or has his leg missing below the knee. In the Blue Thunder Variant III count a small hook-nosed figure has been drawn in, apparently by a much later artist, on the man's back, and the words "Hunka Wayuta" have been written in above the figure. The meaning of this, if there is any, has not been determined by the author.

High Dog: "They killed 7 'tigers' in the Black Hills, and as the Crows claimed this territory, they killed 7 Sioux as a reprisal." The Dakota text reads merely "Ikmu 7 wicoapi (*Ígmu šákowin wičáopi* lit. Mountain-lions (cats) seven they-shot)." Swift Dog: No interpretation. Jaw and Jaw Variant: "The kill seven lion." ("The" means "they" in this interpretation. This may be merely a typographical error, or it may result from the fact that the letter "e" is pronounced like the English "ay" in Dakota.)

The High Dog and Swift Dog counts show seven catlike heads in a row. The Jaw and Jaw Variant counts show a lateral view of a cougar. The Jaw count has a large arabic figure "7" drawn in above this puma and the Jaw Variant count has seven vertical marks above it. Vestal's Hunkpapa count gives this event for the year "1845" (Vestal, 1934 b, p. 348).

1846–47

Blue Thunder: "This winter nothing much. 'Buffalo Head' sleeping, died." No Two Horns: " 'Buffalo Head' got died that time." Blue Thunder Variants I, II, and III: " 'Was nothing' Buffalo Head sleeping died." All of the above counts picture an anthropomorphic figure with a bison's head except No Two Horns, who merely shows a bison's head.

High Dog: "One man alone defended 'the feathers,' the flag against great odds in a battle with the Crows." The Dakota text reads "Tabubu alowanpi (lit. Hump-back's *alówanpi* ceremony)." Swift Dog: No interpretation. Jaw and Jaw Variant: "Pabobo." The last four counts show what is evidently an Alówanpi or Hunká ceremony. A man is shown with the decorated wand used in this rite. In the High Dog and Swift Dog counts he is presenting it to a second person but in the Jaw and Jaw Variant counts only one person is shown. American Horse gives what may be the same event, stating "Big Crow and Conquering Bear had a great feast and gave many presents" (Mallery, 1886, p. 142). Vestal's Hunkpapa count gives "*Pabóbo alówanpi* Pabobo's adoption ceremony" (Vestal, 1934 b, p. 349).

1847–48

Blue Thunder: "West of Cedar Creek, camping. White man camping too. Lived with him. 'Bad after Women.' " No Two Horns: "At the forks of the Cedar and the Cannon Ball a white man had a house by the side of a Sioux tipi." Blue Thunder Variants I, II, and III: "Camping by upper C. B. [Cannon Ball, JH] River and a White lived w. [with, JH] them. Call him 'Bad after women.' " The above counts show a tipi next to a log cabin. This whole pictograph is shown as being situated in the fork of a river, which is drawn as if on a map.

High Dog: "They camped by a Creek (in South Dakota) and from having obtained Whiteman's blankets they called it 'Blanket Creek.' " The Dakota text reads "Sina okipata wakipa el wanitipi (*Šína-okìpata wakpá el wanítipi* lit. Blanket quilted creek at they-camped-for-the-winter)." Swift Dog: No interpretation. Jaw and Jaw Variant: "Some talk discussed."

The High Dog and Swift Dog counts both show a tipi with a striped blanket beside it. The Jaw and Jaw Variant counts show very puzzling pictographs for this year. On both, two men, evidently both Dakota, are apparently speaking with each other. Between them is a stick or line with four small round objects attached to it. On the Jaw Variant count a large square of blue is above both the men and this object. Vestal's Hunkpapa count gives "*Wojún ecónpi. Óta* Many contests," for the year "1847" (Vestal, 1934 b, p. 349).

1848–49

Blue Thunder: "Two attack each other, Ree and Wiceyelo." No Two Horns: "Two killed each other with knives." Blue Thunder Variants I, II, and III: "A Ree and a Wicijela killed each other." The Blue Thunder, No Two Horns, and Blue Thunder

Variant II and III counts show a lively action drawing of two men fighting with knives. Both are wounded. The "enemy" hairdress is not shown on either.

The Blue Thunder Variant I count apparently depicts a different event. This count shows a man in scout's costume, consisting of a white capote and head kerchief, firing at a group of six men who wear the "enemy" hairdress. These men are returning his fire. Both the scout and his opponents are armed with rifles. One of the "enemies" is represented as wounded.

High Dog: "The Crows took a Sioux woman and held her as a 'slave.'" The Dakota text reads "Winya wayaka wicaynazpi (*Wínyan wayáka wičáyuzapi* lit. Woman captive (slave) they took)." Swift Dog: No interpretation. The High Dog and Swift Dog counts show a man on horseback, carrying a shield and wearing the "enemy" hairdress, charging down upon a woman.

Jaw and Jaw Variant: "No grass." The Jaw and Jaw Variant counts show a representation of a few blades of grass on a field. Vestal's Hunkpapa count has "No grass" for the year "1848" (ibid., p. 349). White Bull gives this event for "1848" as well (ibid., p. 266).

1849–50

Blue Thunder: "Wiciyelo living in log house, die without sickness. 'Has Thunder' his name." No Two Horns: "We found a dead Indian in a dry log house somewhere then." Blue Thunder Variants I, II, and III: "Wicijela 'Has Thunder' living in a big house died with sickness." The above counts show a man's body laid out in a log house.

High Dog: "They went to hunt buffalo and were surprised by the Crows." The Dakota text reads "Wanaseta natahi (*Wanáse-ta natáhi* lit. Hunters-moose [*Ta* means moose literally, but is probably used here in a generic sense for all large game, JH] charged-upon)." Swift Dog: No interpretation. Jaw and Jaw Variant: "Battle of hunting."

The High Dog count shows a man on horseback counting coup on a man who stands in front of him with a rifle. The man has the "enemy" hairdress. The Swift Dog count shows the same except that the man on horseback is wearing a warbonnet. The Jaw count shows two men firing at one another. Between the two men is a buffalo. Flashes of rifles are shown as well as bullets. The Jaw Variant count is similar but more symbolic in nature. A large bison hoofprint is in the center. On either side of this are representations of rifle flashes. These are in turn flanked by horses hoofprints, and the hoofprints are flanked by arrows. The same incident is given for the year "1849" by White Bull (Vestal, 1934 a, p. 266) and on Vestal's Hunkpapa count (ibid., 1934 b, p. 349).

1850–51

Blue Thunder: "Camping below Mandan winter. Saw white man come to trade. Wiciyelo shot him with arrow. Not die but killed Wicheyelo. Chief 'Two Bears' told Indians to kill murderer." No Two Horns: "A Dakota killed a white man with an arrow." Blue Thunder Variants I, II, and III: "Camping over from C. B. [Cannon Ball, JH] River & a trader came to trade a Wicejela killed the would be murderer Chief Two Bear told Indians to kill him."

Blue Thunder, No Two Horns, and Blue Thunder Variants II and III show an arrow in a man who is evidently an Indian but is partially dressed in white man's clothing. The No Two Horns and Blue Thunder Variant I counts are similar, but apparently represent a white man, as no Indian clothing is in evidence. He wears a beard in the Blue Thunder Variant I count.

High Dog: "Chief Catch Turtle died." The Dakota text reads "Kewayuspata (*Kéya yùspa t'a* lit. Turtle-catcher died)." Swift Dog: No interpretation. Jaw and Jaw Variant: "Mud Turtle die." The last four counts show a man with a turtle, or, in the Jaw Variant count, merely a turtle. Vestal's Hunkpapa count gives the year "1850" as "Turtle Catcher dies" (ibid., p. 349).

1851–52

Blue Thunder: "Ree Indian 'Red Elk' across Washburn place came with Dakota, wintered. Call that time 'Wintered Red Elk.' " No Two Horns: " 'Red Elk' died winter." Blue Thunder Variants I, II, and III: " 'Ree' 'Red Elk' across from Washburn, lived with Wicijela."

The Blue Thunder and Blue Thunder Variant counts I, II, and III show an anthropomorphic figure with a red elk's head and upper body. No Two Horns merely shows a red elk.

High Dog: "They wintered by Slave Heart Butte." The Dakota text reads "Wayaka Paha el waniti (lit. Captive Butte at they-camped)." Swift Dog: No interpretation. Jaw and Jaw Variant· "The Black [Hills ? JH] camp one." The high Dog and Swift Dog counts show a tipi beside a hill. From the center of the hill a small round face peers out. The Jaw and Jaw Variant counts show a tipi beside a black hill.

1852–53

Blue Thunder: "East of Berthold they wintered on Corn Hill. That winter much snow. Had to wear snowshoes. Buffalo; many, many." No Two Horns: "Snow shoe winter." Blue Thunder Variants I, II, and III: "East of Ft. Berthold by 'Cave Hill' Wicijela wintered, Deep snow, Hunt on S. [Snow, JH] Shoes." All of the above counts show a man wearing snowshoes. White Bull calls the year

"1852" "Plenty Snow Winter" (Vestal, 1934 a, p. 266). Good (Mallery, 1893, p. 323) and High Hawk (Curtis, 1908, p. 176) both mention a severe winter.

High Dog: "A distemper in the winter. This same winter they made a treaty with the Crows." The Dakota text reads "Psa akiya akili alakata (*Psá okíu agli* ______ (?) lit. Crows met-together came-back ______ (?))." Swift Dog: No interpretation. Jaw and Jaw Variant: No interpretation for this year.

The High Dog and Swift Dog counts show a man wearing the "enemy" hairdress standing beside a tipi. The Jaw and Jaw Variant counts show two men shaking hands, one of whom wears the "enemy" hairdress. The interpretation of the High Dog count seems to relate these last four counts to the Flame, Lone Dog, Mato Sapa, Bush, and Swan counts for the year 1851–52, which represent a treaty with the Crow (Mallery, 1886, pp. 120–121). The pictographs on the Jaw and Jaw Variant counts make this even more certain. The pictographs on the High Dog and Swift Dog counts, however, which show a man with the "enemy" hairdress outside a tipi, seem more closely related to the Flame, Lone Dog, Mato Sapa, Bush, and Swan counts for the following year (ibid., pp. 120–121). These counts record an enemy coming to the Dakota camp and forcing the Dakota to smoke the peace pipe, thus securing protection for himself and his followers (ibid., pp. 120–121). The Flame states that this man was a Crow, while the Lone Dog and Touch-the-Clouds, son of the man to whose tent these enemies came, say that they were Nez Percé (ibid., p. 121). Vestal's Hunkpapa count records a treaty with the Crow for the year "1852" (Vestal, 1934 b, p. 349).

1853–54

Blue Thunder: "Out in Montana, Powder Creek (River) committed suicide. Only one Crow came attacking Dakota. One got killed attacked alone." No Two Horns: " 'Four Horns' was killed winter." Blue Thunder Variants I, II, and III: "Crow w. [with, JH] War-bonnet was killed in winter in Montana on Powder Creek attacked alone." High Dog "Chief Four Horns was killed. A Crow killed by Sioux." The Dakota text reads "hetopa an waktepi (*Hetópa un wan ktépi* lit. Horns-four wearing a they-killed)." Swift Dog: No interpretation. Jaw and Jaw Variant: "The [They, JH] kill Four Horns."

All of the counts show a man wearing an elaborate headdress with four horns. In the counts of the Blue Thunder group he wears a long capote in addition, and carries a tomahawk and a feathered society lance. Vestal's Hunkpapa count mentions this event for the year "1853" (ibid., p. 349). Densmore, in her "Teton Sioux Music" mentions this event as occurring in 1852 (Densmore, 1918, p. 403). She includes an illustration of a Dakota wearing a copy of the four-horned bonnet worn by this man (ibid., opp. p. 402). Judge Frank Zahn stated that all of the Dakota who took part in the battle in which this man was killed later wore this style of bonnet at dances.

1854–55

Blue Thunder: "Above Berthold, White Earth Creek, battled there. Wicyelo and Hohe." No Two Horns: " 'Scraper' killed by his children." Blue Thunder Variants I, II, and III: "At White Earth Creek Wicijela and Hohe had a battle." High Dog: "Bear Heart was killed by a Crow Indian." The Dakota text reads "Mato cante ktepi (lit. Bear heart they-killed)." Swift Dog: No interpretation. Jaw and Jaw Variant: "The woman kill with knife."

The pictographs on the Blue Thunder and Blue Thunder Variant counts I, II, and III are puzzling when compared with their interpretations. Blue Thunder, No Two Horns, and the Blue Thunder Variant counts II and III show a man carrying a bow in one hand and an elk antler scraper in the other. The Blue Thunder Variant I count shows a man wearing a capote made of a Hudson's Bay blanket. He is carrying a bow in his hand and is represented as being wounded. Above this man's head, and evidently once intended as his name symbol, is the elk antler scraper of the other counts. This is now separated from him by the line which is used on this count to separate the rows of pictographs.

It appears that the person who made this count drew this man dressed in the capote and armed with the bow because he had forgotten the real meaning of the pictograph. In this case the Blue Thunder Variant I drawing is closer to the High Dog and Swift Dog counts than it is to the other counts of the Blue Thunder group. The High Dog and Swift Dog counts show a man wearing the "enemy" hairdress firing upon a man who is wearing a blanket capote and is armed with a bow and arrow. The man with the bow, however, has the name symbol of a bear above his head rather than an elk antler scraper. The Jaw count depicts a man stabbing a woman. The Jaw Variant count shows a woman who has been stabbed in the back.

The Flame, Lone Dog, Mato Sapa, Bush, and Swan counts give "Brave Bear was killed" for this year (Mallery, 1886, p. 121). Cloud Shield also gives "Brave Bear was killed . . ." (ibid., p. 143). American Horse and White-Cow-Killer give the man's name as Conquering Bear (ibid., 1886, p. 143). White Bull gives "Brave Bear was killed" for the year "1854" (Vestal, 1934 a, p. 266). The High Dog and Swift Dog counts for this year seem to be definitely related to these counts.

Vestal's Hunkpapa count gives "Nobody-Catches-Him stabs (His sister-in-law) for the year "1854" (ibid., 1934 b, p. 349). The No Two Horns, Jaw, and Jaw Variant counts seem to be related to this event. The Blue Thunder count, and Blue Thunder Variants I, II, and III seem to combine both events, especially the Blue Thunder Variant I count. The scraper seems to connect the Blue Thunder and Blue Thunder Variant counts I, II, and III with the incident described by No Two Horns, while the bow and the capote shown in the Blue Thunder Variant I count relate them to the "Brave Bear" event. Their interpretations definitely connect them with this occurrence.

1855–56

Blue Thunder: "Fort Pierre in winter time. White man called 'White Beard' called council with Indians. Made treaty with him. Kept him all winter." No Two Horns: "'White Beard' a white man, held the Indians together. He went into the camps and held them." Blue Thunder Variants I, II, and III: "White bearded White man at Pierre came & called all Indians. So came & made a treaty. Kept him there all winter." High Dog: "They had a Whiteman in camp with a long grey beard, and they took care of him through the winter." The Dakota text reads "Putihi ska wa akijaja (*Putínhin-ska wan akizize* lit. Beard-white a detains-them)." Swift Dog: No interpretation. Jaw and Jaw Variant: "First treaty."

All of the counts show a white man with a beard. In the Jaw and Jaw Variant counts he is shaking hands with an Indian. The Flame, Lone Dog, Swan, Mato Sapa, and Bush counts all give the interpretation that this year the Dakota made a treaty with Putínska, or General Harney, at Fort Pierre (Mallery, 1886, p. 121). White Bull (Vestal, 1934 a, p. 266) and Vestal's Hunkpapa count (ibid., 1934 b, p. 349) give the interpretation that this year Harney seized some Dakota and held them prisoner at Ash Hollow.

1856–57

Blue Thunder: "Hohe fight Wiceyelo Hohe named 'Yellow Bucket' got killed." No Two Horns: "'Yellow Pail' killed while on war trail." Blue Thunder Variants I, II, and III: "The Hohe and Wicijela had battle, 'Yellow Bucket' killed." The above counts show a man carrying a bow in one hand and a yellow pail or bucket in the other. He does not wear the "enemy" hairdress. He is represented as being wounded.

High Dog: "Good Bear tore a war-bonnet from a Crow's head in a fight," The Dakota text reads "Wapaha wan yukisapi (*Wapáha wan yuksápi* lit. Warbonnet a tearing)." Swift Dog: No interpretation. Jaw and Jaw Variant: "The loud Bear tore war hat." The High Dog and Swift Dog counts show two warriors on horseback.

One wears the "enemy" hairdress and a long feathered bonnet. The other has torn part of the bonnet trailer off. The Jaw count shows substantially the same things, but only the upper parts of the bodies of the two men are shown. The Jaw Variant count shows only the bonnet itself, with the trailer represented as being torn in two. Vestal's Hunkpapa count gives this event for the year "1856" (Vestal, 1934 b, p. 349).

1857–58

Blue Thunder: "Ree, Mandans, and Gros Ventre got attacked by Wiceyelo. Six Wiceyelo got killed at Fort Berthold." No Two Horns: "They came and killed five winter." Blue Thunder Variants I, II, and III: "Wicijela had battle at Ft. B. [Fort Berthold, JH]; 6 enemy killed," High Dog: "They returned from a battle with the Crows, having killed many." The Dakota text reads "Ota kte pi akili pi (*Ota ktépi aglípi* lit. Many they-killed they-returned)." Swift Dog: No interpretation. Jaw and Jaw Variant: "The (they, JH) brings many kills."

The Blue Thunder count shows five wounded men. The No Two Horns count has only one man but five wound symbols. Blue Thunder Variant counts I and II show six wounded men. The Blue Thunder Variant III count shows five wounded men. The High Dog and Swift Dog counts show a man wearing the "enemy" hairdress with three feathered coup sticks touching his head. The Jaw count shows a man who is wearing the "enemy" hairdress, but is also represented as being scalped, being taken by the hand by a Dakota (brought back). The Jaw Variant count merely depicts a man with the "enemy" hairdress who is also represented as being scalped.

Cloud Shield gives "They surrounded and killed ten Crows" for this year (Mallery, 1886, p. 143). White Bull gives "Ten Crows killed at Captive Butte" for the year "1857" (Vestal, 1934 a, p. 266). Vestal's Hunkpapa count for the year "1857" gives the same Dakota text as High Dog, but translates it "Kills-Plenty (Little-Assiniboin, Sitting Bull's captive 'brother') brought home (ibid., 1934 b, p. 349).

1858–59

Blue Thunder: "Next winter going to camp some place. Crow Indians attack. None killed. 'Eagle Nest' die without sickness. Father of Sitting Bull named 'Jumping Bull' he die too." No Two Horns: "'Eagle Nest' died winter." Blue Thunder Variants I, II, and III: "Going to camp, Crows attacked no one killed that winter. Eagle Nest die with sickness."

The Blue Thunder and Blue Thunder Variant counts I, II, and III show a man with the name symbol of an eagle sitting in a nest. No

Two Horns merely shows the name symbol without the human figure in association.

High Dog: "A man named Paunch killed a white buffalo." The Dakota text reads: "Pato pi pte sa wan o (*Patopi* (?) *pte san wan o* lit. *Patopi* (?) buffalo (actually *buffalo cow* but used here in a generic sense) cream-colored a he-shot." Swift Dog: No interpretation. Jaw and Jaw Variant: "The [They, JH] shooting white buffalo."

The High Dog, Swift Dog, and Jaw Variant counts show a white buffalo with an arrow sticking in its side and a mounted man armed with a bow behind it. The Jaw count shows a man with a bow standing beside a white buffalo which has been wounded with an arrow. Vestal's Hunkpapa count for the year "1858" gives this event as well, identifying the hunter as *Patopi* which is translated "Four Heads" (Vestal, 1934 b, p. 349). The place is indicated as being near Slim Buttes, S. Dak. (ibid., p. 349).

1859–60

Blue Thunder: "'Lone Dog' get killed when eight go to war. One man got home. Fought Hohe and seven got killed in Montana." No Two Horns: "'Red Robe' came back home. Killed seven." Blue Thunder Variants I, II, and III: "Long Dog, Jumping Bull died got killed, 8 went to battle, 7 killed by Hohe." High Dog: "Five brothers named "Simko-hanska (Long Dog) killed by Crows." The Dakota text reads "Sunkahan skaktepi (*Šunka-hánska ktepi* lit. Dog-long they-killed)." Swift Dog: No interpretation. Jaw and Jaw Variant: "Big Crow kill."

The Blue Thunder and Blue Thunder Variant counts I, II, and III show a man wearing a robe and carrying a rifle, behind which are seven wounded men. The No Two Horns count is similar but shows only seven wounds in the place of the men in the other counts. The man has a red robe on the No Two Horns and Blue Thunder Variant I and II counts, a white one on the Blue Thunder and Blue Thunder Variant II counts.

The High Dog and Swift Dog counts show a man with the name symbol of a dog or horse. The Jaw and Jaw Variant counts show a man with the name symbol of a black bird. He is represented as being wounded on the Jaw count and as being scalped on the Jaw Variant count.

The Flame, Lone Dog, Swan, Mato Sapa, and Bush counts mention Big Crow's death for this year (Mallery, 1886, p. 123). Good mentions it as well (ibid., 1893, p. 325). High Hawk mentions this event for the year "1860" (Curtis, 1908, p. 178). White Bull (Vestal, 1934 a, p. 266) and Vestal's Hunkpapa count (ibid., 1934 b, p. 349) give the event for "1859."

1860–61

Blue Thunder: " 'Feather in his Body,' a Wiceyelo, froze to death." No Two Horns: "Eagle Back get sick. Died." Blue Thunder Variants I, II, and III: "A Wicijela 'Feather Body' Froze to death." The Blue Thunder and No Two Horns counts show a man with eagle feathers attached to his body. The Blue Thunder Variant I count shows a man with a bird on his chest. Blue Thunder Variants II and III show a man with a large bird perched on his back.

High Dog: "A man killed 10 race horse and so was named Race-Horse. . . ." The Dakota text reads "Kaginigi suteyapi (*Kaḣniḣnih šutéyaꝑi* lit. Selected-ones caused-to-fail (ruined))." Swift Dog: No interpretation. Jaw and Jaw Variant: "The [they, JH] kills some pretty horse." The last four counts show a horse with an arrow in its back. This event is mentioned in Vestal's Hunkpapa count as well (ibid., p. 349).

1861–62

Blue Thunder: "Camped on Heart River and Hohe stole a lot of horses." No Two Horns: "The Hohe stole many Teton horses winter." Blue Thunder Variants I, II, and III: "Hohe stole a lot of horses from Wicijela (H. [Heart, JH] River)." The above counts show a man wearing the "enemy" hairdress, and the blanket cloth capote and leggings which are sometimes used to designate the Assiniboin, Plains-Ojibwa, and Plains-Cree. The man is leading a horse. Hoofprints beneath the horse indicate plurality.

High Dog: "The [they, JH] tracked the Crows who had stolen some horses from the Sioux and in a fight a Sioux leader named Tracks Weasel was killed. . . ." The Dakota text reads "Itunkasa luta ktepi (*Itúnkasan-lùta ktepi* lit. Weasel-red they-killed." Swift Dog: No interpretation. Jaw and Jaw Variant: "The [they, JH] kill red weasel."

The last four counts show a man with the name symbol of a red weasel. The Jaw Variant count represents him as being scalped. The High Dog and Swift Dog counts show a prominent penis on this man for some reason.

The White-Cow-Killer count mentions a raid for horses by the Crow for this year (Mallery, 1886, p. 144). Good mentions this as well (ibid., 1893, p. 325). High Hawk mentions a raid for horses by the Crow for the year "1862" (Curtis, 1908, p. 178). Vestal's Hunkpapa count for the year "1861" mentions Red Weasel's death (Vestal, 1934 b, p. 349). The author believes that all of the counts mentioned in connection with this year are referring to the same event, but that in some the death of Red Weasel is not noted.

1862–63

Blue Thunder: "Heart River. Hohe attack Sioux there. Twenty killed of Hohe. Call it 'Twenty Hohe got killed winter.'" No Two Horns: "We killed many Hohe on a hill top." Blue Thunder Variants I, II, and III: "Hohes came and were killed." High Dog: "They exterminated a band of 'Hake' with whom they fought. These were probably Creek [Cree, JH] Indians." The Dakota text reads "hohe 20 wicaktepi (Assiniboin-Plains-Ojibwa-Plains Cree 20 they-killed)." Swift Dog: No interpretation. Jaw and Jaw Variant: "The [they, JH] many kills Crows or Hohe."

The Blue Thunder and Blue Thunder Variant counts I, II, and III show a rectangle filled with wounded men who wear the "enemy" hairdress. Rifle flashes are shown as well. No Two Horns has a similar drawing, but shows only one man in the rectangle. The High Dog and Swift Dog counts show a circle with small heads, wearing the "enemy" hairdress, around the inside. There are 15 of these heads shown on the High Dog count, 12 on the Swift Dog count. The Jaw count is similar to the Blue Thunder counts except that the rifle flashes are outside the rectangle, converging upon it. The men are represented as being scalped rather than wounded in the body as in the counts of the Blue Thunder group. The Jaw Variant count has three scalped heads, wearing the "enemy" hairdress, on the summit of a hill. The fight with the Hohe is mentioned in Vestal's Hunkpapa count for the year "1862" (Vestal, 1934 b, p. 350).

1863–64

Blue Thunder: " 'Big Head' was prisoner by soldiers. Let him die when he got home." No Two Horns: " 'Big Brain' died then." Blue Thunder Variants I, II, and III: "Big Head a prisoner of soldiers, Let him come home & he died." The above counts show a man wearing his hair in two braids and with two eagle feathers in his hair. The Blue Thunder Variant I and No Two Horns counts show his head disproportionately large, but the others do not.

High Dog: "While fighting the Crows they found a boy in a coyote trap and killed him." The Dakota text reads "Toka kuwa wan kte (*Toká*(*la*)-*kùwa wan kte* (*pi*,?) lit. Kit-fox hunter a they-killed)." Swift Dog: No interpretation. The High Dog and Swift Dog counts show a man on horseback counting coup on a standing figure wearing the "enemy" hairdress.

A similar event is mentioned for this year by American Horse, Cloud Shield, and White-Cow-Killer (Mallery, 1886, p. 144). They give the boy's tribe as Dakota, however, and the assailants as Crow (ibid., p. 144). Good mentions the event as well, and also reverses the identities of the participants (ibid., 1893, p. 325). High Hawk gives this event for the year "1863" and also states that the boy was a Dakota and that he was killed by the Crow (Curtis, 1908, p. 178). JAW AND JAW VARIANT: "Hooping cough." The last two counts show a man with lines emanating from his mouth to signify coughing. This event is mentioned in Vestal's Hunkpapa count for the year "1863" (Vestal, 1934 b, p. 350).

1864–65

BLUE THUNDER: "Soldier camp to make treaty with Wiceyelo, but they run off. They take three prisoners. 'True Word' at the head of them. He is father of 'Two Bears' and a prisoner at Fort Rice." NO TWO HORNS: "A man was a prisoner. He told the truth then. We named him that." BLUE THUNDER VARIANTS I, II, and III: "Soldiers come to Wicijela. They run off, soldiers got one man called 'True Word' two other prisoners (father of Two Bears) at F. [Fort, JH] Rice." The above counts show a man wearing leg shackles. The Blue Thunder Variant I count shows him wearing a ball and chain as well.

HIGH DOG: "They captured and held a White-woman. They would not give her up because they liked her and believed she meant good luck to them." The Dakota text reads "Wayaka wiyapeyapi (lit. Captive they-traded-back)." SWIFT DOG: No interpretation. JAW AND JAW VARIANT: "White girl capture at fort Piarre."

The last four counts show a white woman dressed in the clothing of the time. The High Dog and Swift Dog counts show her waist pinched in, probably to suggest a corset, a feature of white women which apparently impressed the Dakota. Vestal's Hunkpapa count gives the same event for the year "1864," and he identifies the woman as Mrs. Fanny Kelly (Vestal, 1934 b, p. 350).

1865–66

BLUE THUNDER: "Big Bend country. Wiceyelo camped at Turtle head, got killed by man with knife. Murdered." NO TWO HORNS: " 'Turtle Head' was stabbed to death that time." BLUE THUNDER VARIANTS I, II, and III: "At Big Bend 'Turtle Head' stabbed and killed w. [with, JH] knife." The above counts show a man with the name symbol of a turtle who is represented as having a knife sticking out of a wound in his back. There are several other wounds on his body as well.

HIGH DOG: "They discovered a way to make blood puddin . . . ." The Dakota text, however, reads "Leje awicaya (*Léže awíčaya* lit. Urinate often)." SWIFT DOG: No interpretation. The above two counts show a man with a large penis, which is represented as dripping urine in the High Dog count. This year's symbol might possibly refer to the contraction of some venereal disease from the whites.

Jaw and Jaw Variant: "Many blood cook." The Jaw and Jaw Variant counts show a kettle or bucket which is full of a red liquid. In this case the drawing actually seems to refer to the making of blood pudding, and is not intended to disguise the count's real meaning. It is interesting to note that the interpreter of the High Dog count, when he did not wish to divulge the real meaning of the event pictured, gave instead the interpretation accompanying another count, indicating that he was familiar with at least two different winter counts.

1866–67

Blue Thunder: " 'Pizi' (Gall) tried to make a treaty at Fort Rice, but soldiers stabbed him. He had not done anything bad. He and Grass went together to talk with that head soldier." No Two Horns: " 'Gall' was stabbed by a soldier bayonet at bend of river, below where Elbowoods is now. There were soldiers houses there." Blue Thunder Variants I, II, and III: "Gall went to F. [Fort, JH] to make a treaty. Soldiers tried to kill him. He had not done anything." High Dog: "Pizi, Gall, the man of all men on the Indian side when Gen'l Custer went down in defeat on June 25, 1876, was taken by Gen'l Miles and held prisoner. It was for a time believed he had been put to death." The Dakota text reads simply "Pizi capapi (lit. Gall they-stabbed)." Swift Dog: No interpretation.

Blue Thunder, No Two Horns, and Blue Thunder Variants I, II, and III show a man who has the bayonets of two rifles stuck into his body. The High Dog and Swift Dog counts show a soldier stabbing an Indian with a bayoneted rifle.

Jaw and Jaw Variant: "Seven Emeni [Enemy, JH] kill." The Jaw count shows a circle in which the heads of seven Indians wearing the "enemy" hairdress are depicted. The Jaw Variant count shows a circle as well, but the four men inside it are evidently soldiers, for they are wearing black hats and blue coats. There are rifle flashes around the outside of the circle.

It appears that for this year the Jaw and Jaw Variant counts are depicting different events. White-Cow-Killer gives "Seven-Pawnee-killed-winter" for 1867–68, and this seems related to the event on the Jaw count (Mallery, 1886, p. 144). The representations of the men as white soldiers on the Jaw Variant count seems to connect its pictograph with the Fetterman Massacre of December 21, 1866. This is given as "One hundred white men killed" on the American Horse and White-Cow-Killer counts for this year (ibid., p. 144). High Hawk gives it for "1867" (Curtis, 1908, p. 179). White Bull gives it for "1866" (Vestal, 1934 a, p. 269). Vestal's Hunkpapa count gives it for "1866" also (ibid., 1934 b, p. 350).

1867–68

Blue Thunder: "Nothing winter. Hard winter too. Call 'Carry the wood winter.' Two boys froze to death then." No Two Horns: "The children of 'Takes the Wood' die then." Blue Thunder Variants I, II, and III: "Hard winter 'Takes-the-Word' S 2 [Sons, two, JH] boys froze."

The above counts show two figures dressed in white capotes lying in a horizontal position. The name symbol of an arm taking a branch of wood (shown on the Blue Thunder count and on Blue Thunder Variants II and III), a man taking a branch (shown on Blue Thunder Variant I) or merely a branch (shown on the No Two Horns count), indicate that the Blue Thunder and No Two Horns interpretations of the father's name are correct.

High Dog: "A Sioux woman broke her leg." or "A Sioux woman died over in Montana. . . ." The Dakota text reads "Winya wan hu wakise (*Wínyan wan hu wan ksa* lit. Woman a leg a broke)." Swift Dog: No interpretation. The High Dog and Swift Dog counts show a woman whose leg is broken and bleeding.

Jaw and Jaw Variant: "Many icey weather." The Jaw and Jaw Variant counts merely show a blue circle, representing ice, for this year. On the Jaw count this is the only pictograph which uses any color besides red or black, although blue is also used for the lines connecting the pictographs to show the sequence of events. A cold winter with ice or sleet is mentioned by White Bull for the year "1867" (Vestal, 1934 a, p. 267). Vestal's Hunkpapa count mentions this as well (ibid., 1934 b, p. 350). White Bull mentions the leg breaking event in connection with this year as well, but does not include it in the name of the year (ibid., 1934 a, pp. 267–268).

1868–69

Blue Thunder: "Catholic priest Father De Smet tried to make a treaty with the Tetonwanna [Teton division of the Dakota, JH] Blue Thunder drive twenty Tetons home to take. Sitting Bull had good men sent with them Gall to see what terms to make treaty, Were their envoys when they got there. Gall made prisoner. Gave word they were going to hang him too. Two Bears protested. They took off his shirt and slashed and beat him. Then let him go. Tetons very angry. No peace, no trust." No Two Horns: "A priest went into Sitting Bulls camp and shook hands." Blue Thunder Variants I, II, and III: "De Smet went to Tetons to make treaty. 'Blue Thunder' went with him S [Sitting, JH] Bull's head men." The above counts all show a Catholic priest carrying an American flag.

High Dog: They slew 15 Crow Indians. "The Dakota text reads "Itazipco ake zapi ta wocaktepi (*Itázipčo ake-záptan wičáktepi* lit.

Sans-arcs fifteen they-killed)." Swift Dog: No interpretation. Jaw and Jaw Variant: "Kill fifteen No Crows." The High Dog and Swift Dog counts show 5 men, not wearing the "enemy" hairdress, and 15 vertical marks. The Jaw and Jaw Variant counts show a man with a bow, also not wearing the "enemy" hairdress, and 15 vertical marks. The Jaw Variant count shows a coup stick touching his head in addition. In the light of the Dakota text and the absence of the "enemy" hairdress in the pictographs it seems likely that the High Dog identification of the men as Crows is incorrect. The bow in the Jaw and Jaw Variant counts indicates that the men were Sans-arcs (lit. No-bows, the Itazipco division of the Teton Dakota). The "No Crows" of the Jaw and Jaw Variant interpretation is probably an incorrect rendering of "No Bows." The use of the bow device is noted by Mallery for the year 1815–16 on the Flame, Lone Dog, and Swan counts, and it probably occurs on the Mato Sapa and Bush counts also (Mallery, 1886, p. 109).

Good's count mentions 15 Sans Arcs being killed for this year as well (Mallery, 1893, p. 326). High Hawk gives this event for the year "1869" (Curtis, 1908, p. 179). White Bull (Vestal, 1934 a, p. 268) and Vestal's Hunkpapa count (ibid., 1934 b, p. 350) give it for "1868."

1869–70

Blue Thunder: "Wiceyelo went up and attacked the Rees. A man with a wife. Wiceyelo saw them and killed them both." No Two Horns: "A man dressed like a woman killed. He was part man and part woman." Blue Thunder Variants I, II, and III: "Wicijela attacked Rees. Saw a man and woman getting wood & killed them (Wicijela)." The above counts show a woman with a bundle of wood on her back. She is represented as being wounded.

High Dog: "They slew 30 Crow Indians." The Dakota text reads "Kanigi wicasa 30 wicaktepi (*Kanġí-wičàša wikčémna-yàmni wičáktepi* lit. Crow men thirty they-killed)." Swift Dog: "No interpretation. Jaw and Jaw Variant: "30 Crows kill." The High Dog and Swift Dog counts show a circle with several human heads around the inside. The heads are shown wearing the "enemy" hairdress. In the High Dog count 14 heads are shown, in the Swift Dog, 15. The Jaw count shows a scalped man, wearing the "enemy" hairdress, under which there are 30 vertical marks. The Jaw Variant count shows the same with the addition of a feathered coup stick touching the man's head.

The Lone Dog, Mato Sapa, Bush, and Swan counts record a battle with the Crow for the year 1870–71, but Lone Dog states that only 29 of the 30 Crow were killed (Mallery, 1886, pp. 126–127). This event is mentioned by White Bull (Vestal, 1934 a, p. 268) and in Vestal's Hunkpapa count (ibid., 1934 b, p. 350) for "1869."

1870–71

Blue Thunder: "Wintered at first Grand River and many horses die, drowned. . . ." No Two Horns: "Many horses froze to death winter." Blue Thunder Variants I, II, and III: "At Grand R. [River, JH] many horses die in flood." Blue Thunder and the Blue Thunder Variant counts I, II, and III show a horse and many hoofprints, indicating plurality. The No Two Horns count merely shows a horse's head and neck, together with hoofprints.

High Dog: "Chief Crowfeather died (Natural death)." The Dakota text reads "Kangi wiyakata (*Kanġí-wìyaka t'a* lit. Crow feather he-died)." Swift Dog: No interpretation. Both counts originally showed a man with the name symbol of what appears to be the feather of a golden eagle. On the High Dog count, however, the figure of a Crow has been added in blue ink at a later date. Perhaps the event noted for this year is the same as that given by the Flame, as the drawings are very similar (Mallery, 1886, p. 126). The interpretations of the two counts, however, do not support this idea.

Jaw and Jaw Variant: "Chippiwai came." Both the Jaw and the Jaw Variant counts show a man in a small four-wheeled wagon or cart. In the Jaw Variant count he is wearing a red coat or shirt.[6] The pictograph probably refers to a visit of the Plains-Ojibwa—Plains-Cree mixbloods. Vestal's Hunkpapa count gives this event for the year "1870" (Vestal, 1934 b, p. 350).

1871–72

Blue Thunder: "White man got killed by Dakota. 'Brain' killed him." No Two Horns: " 'Brings Back' shot a white man winter." Blue Thunder Variants I, II, and III: "White man killed by 'Brain.' " The Blue Thunder count and Blue Thunder Variants I, II, and III show a man dressed in white man's clothing, with, however, long black hair and a wawóslata wanápin or bone hair-pipe necklace. He has an arrow protruding from a wound in his side. The No Two Horns count shows substantially the same, but pictures the man with short hair and without the Indian necklace.

High Dog: "Little Crow, a chief died." The Dakota text reads "Kangi cigalata (*Kanġí čígala t'a* lit. Crow little he-died)." Swift Dog: No interpretation. Both counts show a man with the name symbol of a black bird.

---

[6] The present writer believes that the red coat is to carry the idea of "ša", or scarlet, in the word Šagdáša, which is the word commonly used by the Dakota to designate Canadians. The word is apparently a loan word in Dakota, probably from some Algonquian language. Present-day Dakota have a folk method of "analyzing" unfamiliar words by splitting them into their component syllables. This works fine with Dakota words, but, of course, is invalid in the case of borrowed words, in this case, for example, where the Šagdáša is depicted with a red coat merely because the last syllable of his group's name happens to be the same as the Dakota word for "scarlet." For a similar instance of this sort see the High Dog and Swift Dog counts for the year 1814–15.

Jaw and Jaw Variant: "Chase horses around the camp." Both counts show a tipi with hoofprints circling it. Vestal's Hunkpapa count gives this event for the year "1871" (Vestal, 1934 b, p. 350). Vestal mentions that the Crow stole nearly all of the Dakota horses during this raid (ibid., pp. 171–172).

1872–73

Blue Thunder: " 'Two Bears' went to Washington. Came back. Went to war. 'Standing Bull' (Buffalo) got killed by another Wiceyelo or Hohe maybe. Clashed over policy to Whites." No Two Horns: " 'Standing Buffalo' killed by some one unknown. Up north on a river place. . . ." Blue Thunder Variants I, II, and III: " 'Two Bears' at Wash-ton [Washington, JH] when he got back, a battle and 'Standing Bull' killed by another Wiciyela." The Blue Thunder count and Blue Thunder Variants I, II, and III show an anthropomorphic figure with a bison's head. He is represented as being wounded. No Two Horns merely shows a wounded bison standing on its rear feet.

High Dog: "Turning Bear killed a Crow who came to his tent to fight." The Dakota text reads "Mato kawige ti hi wankte (*Mató-kawinge ti hi wan kte* lit. Bear-turning-to-recline lodge came a he-killed)." Swift Dog: No interpretation. Both counts show a mounted man counting coup on a man who is not mounted and who wears the "enemy" hairdress. The mounted man has the name symbol of a bear.

Jaw and Jaw Variant: "Crow Kill on White Horse." Both the Jaw and Jaw Variant counts show a wounded man who is wearing the "enemy" hairdress and is mounted on a white horse. The Jaw Variant count shows the man to be scalped and with a feathered coup stick touching his head. White Bull (Vestal, 1934 a, pp. 268–269) and Vestal's Hunkpapa count (ibid., 1934 b, p. 350) refer to an enemy on a horse, identified as a Crow by White Bull, being killed, for the year "1872."

1873–74

Blue Thunder: "Boy soldier, 'Bad Bird,'—Sioux Scout got killed by white man at Fort Rice." No Two Horns: "The whites killed Bad Bird Winter." Blue Thunder Variants I, II, and III: " 'Bad Bird' 'Big Soldier' Sioux Scout killed by Whitemen (Rice)." All of the above counts show a man wearing a soldier's uniform who is wounded. The name symbol of a bird is above his head. He wears a hat in the Blue Thunder, No Two Horns, and Blue Thunder Variant II, and III counts, but in the Blue Thunder Variant I count he wears a small feather "dream headdress" at the back of his head.

High Dog: "A Crow stole a white horse from someone." The

Dakota text reads "Ika colo tawa wan eyayapi (*Ikán-čòla túnwan wan iyáyapi* lit. Rope-without reins a they-went-away)." Swift Dog: No interpretation. Both counts show a white horse with a rope about its neck.

Jaw and Jaw Variant: "Five Canadian kill." Both counts show a circle with small heads inside. There are rifle flashes and on the Jaw Variant count horses hoofprints. Five heads are shown on the Jaw count, and they are represented as Indians. Four heads are shown on the Jaw Variant count, and they are represented as whites or mixbloods, as they wear hats. Vestal's Hunkpapa count gives the year "1873" as the year in which the Dakota fought with the Red River mixbloods (Vestal, 1934 b, p. 350). This event is mentioned by White Bull as well, also for "1873," but is not used in the name of the year (ibid., 1934 a, p. 269).

1874–75

Blue Thunder: " 'Rain-in-the-Face' and Big Bear or Tom Hannan in prison at Fort Abraham Lincoln. Rain in the Face not known much before this time." No Two Horns: " 'Rain in the Face' (Itomagaju) [Ité-o-maǧàzu, JH] was prisoner at Fort Abraham Lincoln." Blue Thunder Variants I, II, and III: "Rain-In-The-Face & Two Horns (Wopepe) prisoners." All of the above counts show an Indian man with a small rain cloud above his head which is raining down on his upturned face. He wears leg irons.

High Dog: "A fat Crow Indian was killed by the Sioux. . . ." The Dakota text reads "Toka cepa wan kte pi (*Tóka čépa wan ktépi* lit. Enemy fat a they-killed)." Swift Dog: No interpretation. Jaw: "Fat crow Indian kill." The High Dog and Swift Dog counts show a man wearing the "enemy" hairdress. There was apparently no indication of the man's obesity on either count originally, but at some late date someone has drawn a few extra lines, apparently to show his fatness, on the High Dog count. The Jaw count shows a fat man who has been scalped. The Jaw Variant count omits this year, probably due to an oversight in the copying, as the pictographs for this year and the following year are quite similar on the Jaw count. Vestal's Hunkpapa count mentions the fat Crow's death for the year "1874" (Vestal, 1934 b, p. 350).

1875–76

Blue Thunder: "Found keg of whiskey at Fort Yates place, near the shore. Made a council and drank it all up. Many drunk." No Two Horns: "Found a barrel of whiskey. Had a good time." Blue Thunder Variants I, II, and III: "They found a barrel of whiskey near store at Yates, Had a council and drank it all up. Knew whiskey well, Lots of it before, I drink and was drunk."

Blue Thunder and No Two Horns show a keg of whiskey set on end with whiskey flowing from a bunghole into a cup. Blue Thunder Variants I, II, and III merely show a keg, a jug, and a cup in association. White Bull mentions whiskey for the year "1875" but does not include it in the name for the year (ibid., 1934 a, p. 269). He states that it was given to the treaty party which signed the Black Hills treaty, and that they were drunk in order to get them to sign.

High Dog: "In early summer we were visited by Appache [sic, JH] Indians who rode white horses. . . ." The Dakota text reads simply "Sunka ska hi kin (lit. Dog white came the)." Swift Dog: No interpretation. Jaw and Jaw Variant: "White dog came." The High Dog and Swift Dog counts show a man wearing the "enemy" hairdress who has the name symbol of a white dog above his head. The Jaw count shows a man who is wearing the "enemy" hairdress and is represented as having been scalped. The Jaw Variant count shows the same, but has the name symbol of a brown horse above his head in addition.

Vestal's Hunkpapa count for the year "1875" gives a Dakota text almost identical with that given by High Dog, but interprets it "White Dog (Hohe chief) visits (and makes peace with the Sioux)" (Vestal, 1934 b, p. 350). The author believes this to be the correct interpretation of this year's pictographs.

1876–77

Blue Thunder: "Took all ponies away from Sioux by soldiers at Fort Yates." No Two Horns: " 'Long Hair' (Pehanska) killed by the Sioux." Blue Thunder Variants I, II, and III: "Took all ponies away." Blue Thunder, No Two Horns, and the Blue Thunder Variant II count show a white soldier who is mounted and carries a rifle or carbine. Below the horse are many hoofprints, indicating plurality. Blue Thunder Variants II and III show substantially the same but the man is dismounted and is leading the horse.

The taking of horses from the Dakota is given for this year by the Flame and White-Cow-Killer (Mallery, 1886, p. 127). Custer's death is mentioned by White Bull (Vestal, 1934 a, pp. 269–270) and in Vestal's Hunkpapa count (ibid., 1934 b, p. 350) for the year "1876." White Bull also mentions the taking of the horses but does not include it in the name of the year (ibid., 1934 a, pp. 269–270).

High Dog: "Sitting Bull made a treaty with the French (half-bloods) in Canada." The Dakota text reads "tatka iyota ke taku akilesa ob (*Tatánka-iyòtake táku ogléša ob* lit. Buffalo bull-sitting down something red-coats with)." Swift Dog: No interpretation. Jaw and Jaw Variant: "Red Coats treaty."

The High Dog and Swift Dog counts show an Indian with the name symbol of a bison head shaking hands with a white man wearing a red coat. The Jaw and Jaw Variant counts merely show a white man wearing a red coat.

Vestal's Hunkpapa count gives the treaty with the redcoats for the year "1877," which, according to the arrangement of the previous years, refers to the winter of 1877–78 (ibid., 1934 b, p. 350). This would seem to be an error of duplication, as this count also gives the "Long Hair Killed" event, using it for the previous year (ibid., 1934 b, p. 350).

1877–78

Blue Thunder: "'Lean Bear' died in log house." No Two Horns: "'Poor Bear' died then winter." Blue Thunder Variants I, II, and III: "Lean Bear died in log cabin." Blue Thunder and Blue Thunder Variants I, II, and III show an anthropomorphic bear. The "poor" or "lean" idea is suggested by drawing in the leg and rib bones, as if they were showing through the skin. No Two Horns merely shows a very thin bear.

High Dog: "One Star was killed by the Crows." The Dakota text reads "Wicagipi wanjila ktepi (*Wičánȟpi wanžíla ktépi* lit. Star only-one they-killed)." Swift Dog: No interpretation. The High Dog and Swift Dog counts show a man with the name symbol of a star. The Jaw and Jaw Variant counts give this event for the following year, as does Vestal's Hunkpapa count (for the year "1879") (Vestal, 1934 b, p. 351).

Jaw and Jaw Variant: "hole in the Nose came." Both the Jaw and Jaw Variant counts show a man wearing the "enemy" hairdress who has a neat round hole in the side of his nose. This pictograph probably refers to the visit of the refugee Nez Percé to Sitting Bull's camp after Chief Joseph's defeat. Vestal's Hunkpapa count gives this event for the year "1878" (ibid., pp. 350–351).

1878–79

Blue Thunder: "Old 'Two Bears' die." No Two Horns: "'Two Bears' a Chief dies winter." Blue Thunder Variants I, II, and III: "Old 'Two Bear' died." All of the above counts show a man with the name symbol of two bears heads.

High Dog: "Little Bear was killed by the Crows." The Dakota text reads "Mato cigalato ahiktepi (lit. Bear little-blue (?) they-came-and-killed)." Swift Dog: No interpretation. Both counts show a man with the name symbol of a bear. He is represented as being scalped on the High Dog count, but not on the Swift Dog count.

Jaw and Jaw Variant: "Lone Star Kill." Both counts show a wounded man. On the Jaw Variant count he is shown with the name symbol of a star above his head. He is also represented as being scalped on this count. The Jaw count shows an "x" on his chest which may be either a star or a mark of bravery. Vestal's Hunkpapa count gives Lone Star's death for the year "1879" (Vestal, 1934 b, p. 351).

1879–80

BLUE THUNDER: " 'Crazy Walker' sick. Carried in blanket and sick to another place and get well again." NO TWO HORNS: " 'Crazy Bear' was carried on a blanket then. . . ." BLUE THUNDER VARIANTS I, II, and III: "They carried 'Crazy Walker' on a blanket, He was sick." The above counts show a man on a blanket with the name symbol of a bear above his head. The bear has wavy lines emanating from his nose. Such lines usually signify either "crazy" or "holy" in Dakota pictographs.

HIGH DOG: "He-has-a-red-spear died." The Dakota text reads "tawahu kezalutata (*Tawahúkeza-lùta t'a* lit. His-spear-red died)." SWIFT DOG: No interpretation. The High Dog and Swift Dog counts show a man with the name symbol of what appears to be a black arrow.

JAW AND JAW VARIANT: "Horses disease." The Jaw and Jaw Variant counts show a horse with spots on its body, indicating mange or some such disease. Vestal's Hunkpapa count gives this event for the year "1880" (Vestal, 1934 b, p. 351).

1880–81

BLUE THUNDER: " 'Broken Head' made a big feast in winter time." NO TWO HORNS: " 'Cracks his Head' gave a big feast known as winter." BLUE THUNDER VARIANTS I, II, and III: "Broken Head made a big feast." The above counts show three figures seated in a tipi. On the Blue Thunder Variant III count a small figure has been drawn in beside the tipi, apparently at a later date. It appears to be a dog or a wolf, and seems to have no relationship to either this or the preceding year's pictograph.

HIGH DOG: Beede does not know what this year's pictograph represents. He believes that it may refer to Gall stopping a sun dance. The Dakota text reads "Pizi ti. (lit. Gall's lodge)." Judge Frank Zahn says that during this year Gall's camp on the Tongue River was fired upon by soldiers. SWIFT DOG: No interpretation. JAW AND JAW VARIANT: "Capture of Sitting Bull." The High Dog and Swift Dog counts show a white soldier firing on an Indian tipi. Several rifle flashes are shown. The Jaw and Jaw Variant counts show a group of tipis with rifle flashes and streaks as if bullets were intended to be shown.

The author believes that Beede's suggested interpretation is incorrect. Gall, himself an Indian, would hardly fire upon his own people to stop one of their religious ceremonies. Indeed, he is never recorded as having done so. Furthermore, at this time he was not in the employ of the Government.

The Jaw interpretation seems quite false as well. Sitting Bull's capture and death occurred in 1890, 10 years after the previous year's pictograph. A hiatus of 10 years on this count would be quite difficult to explain. One also wonders why no indication of Sitting Bull's identity is made if the pictograph refers to his capture and death.

The present writer feels that the pictographs on the High Dog, Swift Dog, Jaw, and Jaw Variant counts refer to Maj. Guido Ilges' attack on the Dakota, which is given in Vestal's Hunkpapa count for the year "1881" as "Sioux fired over" (Vestal, 1934 b, p. 351). The error in the title of the winter on the Jaw count can probably be attributed to the "educated boy" who, Welch writes, made the titles of the winters.

1881–82

BLUE THUNDER: " 'Red Bow' mother die." NO TWO HORNS: "Mother of 'Red Bow' die that time." BLUE THUNDER VARIANTS I, II, and III: " 'Red Bear's mother died." The Blue Thunder and Blue Thunder Variant counts I, II, and III show a woman carrying a red bow. The No Two Horns count shows a woman in a red dress with a red bow above her as a name symbol.

HIGH DOG: "Whiteman called White-Beard [Major McLaughlin, JH] led the hostiles to feel friendly toward the government." The Dakota text reads "Pehi ska kin Napeyuzapi (*Pehínska kin napéyuzapi* White-beard the they-shook-his-hand)." SWIFT DOG: No interpretation. The above two counts show a white man and an Indian shaking hands.

JAW AND JAW VARIANT (closing date of both counts and of the Jaw interpretation): "Thirty five years since Sioux came to Standing Rock." Both the Jaw and Jaw Variant counts show a representation of the well-known "Standing Rock" monument which stands opposite the Superintendent's residence in Fort Yates at the present time. On the Jaw Variant count the date "1881" is inscribed on the base on which the stone is set. Beneath the Jaw pictograph for this year are 35 vertical marks which seem to explain the title given to this year's event by the "educated boy."

This year's interpretation seems to correlate with White Bull's count for the year "1881" which states "They Stop at Standing Rock to Camp for the Winter" (Vestal, 1934 a, p. 270). Both the Jaw and Jaw Variant counts end with this year, unless we wish to state that the vertical marks, one of which seems to have been added for each year after the last pictograph was drawn, are worthy of consideration as year pictographs. Since the Jaw count spirals inward and there is little space left in the center, this device may have been resorted to merely for lack of space. Another possible explanation is that the maker may have thought that since the tribe was on the reservation and the old life gone forever, there was really nothing left worth noting except the passage of time. If each vertical mark is considered as a year the closing date of the Jaw count is 1916–17.

1882–83

Blue Thunder: " 'Little Bird' die suddenly." No Two Horns: " 'Little Bird' die fast. Quick." Blue Thunder Variants I, II, and III: "Little Bird died suddenly." The above counts show an Indian man carrying a tomahawk. Above his head is the name symbol of a bird.

High Dog: "White Beard went on a buffalo hunt with the Indians." The Dakota text reads "Pehi ska kici wanasapi (*Pehín-ska kíči wanásapi* lit. Beard-white together-with they-hunted-buffalo)." Swift Dog: No interpretation. The last two counts show a white man on horseback shooting at a buffalo with a rifle.

1883–84

Blue Thunder: " 'Red Bull' die suddenly." No Two Horns: " 'Red Bull' was died winter." Blue Thunder Variants I, II, and III: "Red Bull died suddenly." The Blue Thunder and Blue Thunder Variant I, II, and III counts show an anthropomorphic figure with the head and upper body of a red bison. No Two Horns merely shows a red bison.

High Dog: "Three Crow Indians came to visit them as friends." The Dakota text reads "Kangi wicasa 3 hipi (lit. Crow men three they-came)." Both counts show three men wearing the "enemy" hairdress. On the High Dog count, apparently by mistake, the men are represented as being scalped.

1884–85

Blue Thunder: "Old man 'Red Hail' daughter die." No Two Horns: "Daughter of Red Hail die then. No Two Horns own sister."[7] Blue Thunder Variants I, II, and III: "Red Hawk's daughter died." All of the above counts show a woman carrying a handbag with the name symbol of a red hailstone above her head.

High Dog: "Little Crow died." The Dakota text reads "kangi cigalata (*Kanġí-čik'ala t'a* lit. Crow-little died)." Swift Dog: No interpretation. Both counts show a man with the name symbol of a black bird. Perhaps this was another name for Crow King, whose death is recorded by White Bull for the year "1884" (Vestal, 1934 a,

---

[7] By using the term "own sister" No Two Horns indicates that this woman was actually his sister and not a parallel cousin, also called "sister" in Dakota.

p. 270). High Hawk gives "Black Crow died," for the year "1884" (Curtis, 1908, p. 181).

1885–86

Blue Thunder: " 'No Two Horn' made big feast in winter." No Two Horns: "No Two Horns gave big feast in honor of his sister who died last winter time. All the people came. He has much beef and game. . . ." Blue Thunder Variants I, II, and III: "No Two Horns made a big feast (winter)."

All of the above counts show a tipi with three people inside. The No Two Horns count shows a buffalo inside the tipi. It is indicated as being hornless by two lines drawn from the place where the horns would be and connected in front of the animal's head. Blue Thunder Variants I and II show the buffalo outside the tipi. On these counts the hornlessness is also shown in the above manner, but since the buffalo is outside the tipi the pictograph also functions as a name symbol. The Blue Thunder and Blue Thunder Variant III counts merely show a buffalo outside the tipi, making no note of its being without horns.

High Dog: "An old warrior named ——— ——— died." The Dakota text reads "CCeta [sic, JH] wahacakata (*Četán-wàhačànka t'a* lit. Hawk-shield died)." Swift Dog: No interpretation. The pictographs on these two counts are almost identical with those used for the preceding year, the difference being only in the color of the man's shirt. Again a man is shown with a black bird as his name symbol. Perhaps this man was Flying-by, whose death is recorded for the year "1885" by White Bull (Vestal, 1934 a, p. 270).

1886–87

Blue Thunder: " 'Three Thigh' die. Brother of 'Two Bears.' " No Two Horns: " 'Three Legs' died then." Blue Thunder Variants I, II, and III: "2 Bears brother Three thighs died." All of the above counts show a man with three legs.

High Dog: "Good Elk died." The Dakota text reads "heraka howaste ta (*Heḣáka-howàšte t'a* lit. Male-elk-good-voice he-died)." Swift Dog: No interpretation. The last two counts show a man with the name symbol of an elk.

1887–88

Blue Thunder: " 'Fool Bear' living in dance hall. . . ." No Two Horns: " 'Fool Bear' lived in a dance hall then. He did not die." Blue Thunder Variants I, II, and III: "Fool Bear lived in an old dance hall." The above counts show a man in a log cabin who wears a Grass dance costume, including the porcupine and deer-tail roach headdress. In the earlier years of these counts, this headdress was used to indicate an Omaha or a Ponca, but here it is used merely to indicate that the man was a dancer, or living in a dance hall. In the No Two Horns count there is a dance drum in the cabin as well. Living in dance halls was supposed to be dangerous, according to a note by Welch accompanying this count.

HIGH DOG: "Four Horns died." The Dakota text reads "Hetopa ta (lit. Horns-four died)." SWIFT DOG: No interpretation. Both counts show a man with four horns on his head. The death of this man, who was Sitting Bull's uncle, is noted by White Bull for the year "1884" but is not given as the name of this year (Vestal, 1934 a, p. 270).

1888–89

BLUE THUNDER: "'Frosted Red Fish' prisoner at Fort Yates by soldiers." NO TWO HORNS: "'Eagle Claw' was a prisoner at Mandan." (Note by Welch "This was another name for Frosted Red Fish.") BLUE THUNDER VARIANTS I, II, and III: "Frosted Red-Fish prisoner at Yates (Soldiers)." The above counts show an Indian with a leg shackle and a ball and chain. He has the name symbol of an eagle claw above his head.

HIGH DOG: "There was an eclipse of the sun 'The sun turned black and died.'" The Dakota text reads "Wisapata (*Wi-sápa t'a* lit. Moon (or sun) black died)." SWIFT DOG: No interpretation. Both counts show a man with the name symbol of a black crescent. It appears that Beede's interpretation for this year's event was merely a very poor guess. Black Moon was a man's name, and in this year he died. Black Moon's death is noted by White Bull for the year "1888" although it is not used as the name of the year (Vestal, 1934 a, p. 271). This man was Sitting Bull's uncle.

1889–90

BLUE THUNDER: "'Cotton Wood', Yanktonaise Chief, died." NO TWO HORNS: "'Cottonwood' died winter." BLUE THUNDER VARIANTS I, II, and III: "Cotton Wood Chief died." The above counts show a man with the name symbol of a tree. In the Blue Thunder and No Two Horns counts he is standing erect. In Blue Thunder Variants I, II, and III he is reclining.

HIGH DOG: "A woman was killed by a tree falling on her." The Dakota text reads "kowakata el winyawicaka (*Koákatàn el wínyan wicáktepi* lit. Over-there at woman they-killed)." SWIFT DOG: No interpretation. The last two counts show a drawing of a woman. On the Swift Dog count she seems to have a representation of a wound on her body, but this is not clearly drawn.

1890–91

BLUE THUNDER: "Sitting Bull got killed . . ." NO TWO HORNS: "'Sitting Bull' got killed that time." BLUE THUNDER VARIANTS

I, II, and III: "S [Sitting, JH] Bull killed (Dec. 15, 1890)." High Dog: "Sitting Bull was slayn." The Dakota text reads "tata ka iyotake kte pi (*Tatánka-iyòtake ktepi* lit. Buffalo-bull-sitting-down they-killed)." Swift Dog: No interpretation.

The Blue Thunder, No Two Horns, and Blue Thunder Variant counts II and III show a wounded buffalo who is represented as sitting down. Blue Thunder Variant I shows an anthropomorphic buffalo, wounded and in a sitting position. The High Dog and Swift Dog counts show an Indian with the name symbol of a bison head who is being fired upon by a man dressed in a uniform. The death of Sitting Bull is given by White Bull for the year "1890" (Vestal, 1934 a, p. 271). Famous though Sitting Bull was, none of the other counts which were examined, and which include this year, mention his death.

1891–92

Blue Thunder: "Draw money first time. $3.00 each person." No Two Horns: "First money paid to us by the Government $3000 each one." Blue Thunder Variants I, II, and III: "Had a money payment of $3.00 each." The above counts show a small house with an Indian beside it. Inside or near the house are three round objects, probably representing silver dollars. The amusing discrepancy in the No Two Horns interpretation can be explained by the fact that on this count a dollar sign, resembling a figure "3" is drawn in front of the three objects, making it appear that they are aughts, and that the whole is the number "3000".

High Dog: "He-has-a-spotted-horse died." The Dakota text reads "Tasunke heratotata (*Tašúnke-hin-hòta* (?) *t'a* lit. His-horse-hair-grey (?) died)." Swift Dog: No interpretation. Beede seems to have erred once more with the interpretation of this year's pictograph. Both counts show a man with the name symbol of a white (gray) horse.

1892–93

Blue Thunder: "Draw money second time. $40.00 each one for ponies taken away." No Two Horns: "Second time we get money. Paid us $9.00 for our horses . . ." Blue Thunder Variants I, II, and III: "$40.00 each for ponies taken before." The above counts show pictographs similar to those of the previous year, but with more round objects in the "disbursing house." In the Blue Thunder and Blue Thunder Variant II counts 10 silver dollars are shown. No Two Horns shows 9. Blue Thunder Variant I shows 16 and Blue Thunder Variant III shows 13. White Bull gives this event for the year "1893" (Vestal, 1934 a, p. 271).

High Dog: "Horse Shoe died." The Dakota text reads "Shunka mazata (*Šúnka-màza t'a* lit. Dog-iron died)." Swift Dog: No interpretation. Both counts show a man with the name symbol of a horse or a dog. The drawing seems to resemble a dog more closely than a horse. Judge Frank Zahn confirmed the above translation of the Dakota text, stating that "Iron Dog" died at this time.

1893–94

Blue Thunder: "Boy, 12 winters old dragged to death. Got killed. Name 'Money.' " No Two Horns: " 'Money Boy' dragged to death at Mandan Fair." Blue Thunder Variants I, II, and III: "Boy dragged and killed." All of the above counts show a boy being dragged behind a running horse. His name symbol, a few round objects representing silver dollars, is shown by his head in all but the Blue Thunder Variant I count.

High Dog: "He-has-a-red-spear died." The Dakota text reads "Tawahu kezaluta ta (*Tawahúkeza-lùta t'a* lit. His-spear-red he-died)." Swift Dog: No interpretation. Both counts show a man with the name symbol of a red spear. Judge Zahn suggests that this man was probably the son of the person of this same name whose death is recorded for the year 1879–80.

1894–95

Blue Thunder: " 'Carry His Lodge on Back' die." No Two Horns: " 'His arm cut off' died." This man was H. S. Parkins of Cannon Ball." [This year seems to be inverted with the following year in the interpretation of the No Two Horns count, JH.] Blue Thunder Variants I, II, and III: "Man named 'Carry Tent' died." The Blue Thunder and No Two Horns counts show a man with an erected tipi on his back. Blue Thunder Variants I, II, and III show a man carrying what appears to be a folded tipi cover on his back and carrying the tipi poles in his arms.

High Dog: "Chief Gall died." The Dakota text reads "Pizita (*Pizí t'a* lit. Gall died)." Swift Dog: No interpretation. The above counts show a man with two large horns on his head. This is the correct year for Gall's death (1894).

1895–96

Blue Thunder: "White Man, H. S. Parkin, die at Cannon Ball." No Two Horns: "Carry the Lodge died then." [The interpretation for this year seems to be inverted with that for the preceding year, JH.] Blue Thunder Variants I, II, and III: "H. S. Parkin died ('95)." All of the above counts show a representation of a white man who carries a cane and has one arm missing.

High Dog: "A woman was burned to death in her home." The Dakota text reads "Winya wan ili kin (*Wínyan wan ile kin* lit. Woman a burned the)." Swift Dog: No interpretation. Both counts merely show a woman beside a tipi.

1896–97

Blue Thunder: "Son of Chief Big Head die." No Two Horns: " 'Stabbed' has a hemorrage and died that time." Blue Thunder Variants I, II, and III: " 'Paz ipa' [Pazípa-stabbed, JH] son of 'Big Head' died." All of the above counts show a man bleeding from the mouth. Blue Thunder Variants I and II seem to show his head slightly larger in proportion to his body than are the heads of the other figures in the count. The No Two Horns count shows an arm behind the man's back, stabbing him with a knife. This is apparently his name symbol.

High Dog: "A sickness caused pimples on people's heads." The Dakota text reads "Pa wica yuksapi (*Pa wičáyuksàpi* lit. Head they-caused-to-be-broken-off (a hanging))." Swift Dog: No interpretation. Both counts show three figures. One is attached to a pole or tree by a rope around his neck. This year's pictograph probably refers to the locally famous Spicer murder. Three Indians killed a white man who would not give them whiskey. They were later apprehended, tried, found guilty, and hanged.

1897–98

Blue Thunder: " 'Holy Soul' die." No Two Horns: "Tooth Pick' died winter." Blue Thunder Variants I, II, and III: " 'Holy Soul' died." The above counts show an Indian with a pipe and a pipe bag in one hand and holding a long thin object, perhaps an eagle bone whistle or a piece of wood to his mouth with the other.

High Dog: "A woman once taken captive from the Crows and always living with them died." The Dakota text reads however "Kangi wiyakata (*Kanġí-wìyaka t'a* lit. Crow-feather he-died)." The pictographs on both counts show a man with a red and black feather as a name symbol. Beede evidently interpreted the word wíyaka, feather, as wayáka, a slave or a captive.

1898–99

Blue Thunder: " 'Louse Bear' hung himself." No Two Horns: " 'Louse Bear' died then winter." Blue Thunder Variants I, II, and III: "Louse Bear hanged himself." The above counts show a man in uniform, perhaps an Indian police uniform, with the name symbol of a bear covered with conventionalized lice.

High Dog: "Spotted Bear died." The Dakota text reads, however, "mato cuwiyukisa ta (*Mató-čuwiyùksa t'a* lit. Bear-broken-in-two-at-the-pleura died)." Perhaps this is "Half-body-bear." Swift Dog: No interpretation. Both counts show a man with the name symbol of half a bear. The Blue Thunder group of counts gives the death of Half-body-bear for the year 1915–16, but perhaps there were two persons of this name.

1899–1900

Blue Thunder: " 'Grey Bear' playing hockey, drops dead at Mandan Fair." No Two Horns: " 'Grey Bear' died while playing shinny at the Mandan Fair." Blue Thunder Variants I, II, and III: "Gray Bear dropped dead playing shinny at Mandan." All of the above counts show a man with the name symbol of a gray bear carrying a shinny stick and with a shinny ball in front of him.

High Dog: "Hawk Shield died." The Dakota text reads "Ieta wahacanka ta (*Čétan-wàhačànka t'a* lit. Hawk-Shield he-died)." Swift Dog: No interpretation. The last two counts show a man with the name symbol of a feathered shield with a picture of a bird upon it. The reader will note that for the year 1885–86 a man named Hawkshield is recorded as dying. In case one of these two interpretations is misplaced, the pictograph accompanying this year's text would indicate that this is the true year of this man's death. It is entirely possible, of course, that there were two men of this same name, perhaps father and son.

1900–01

Blue Thunder: " 'Worth Hat' got burned in bed." No Two Horns: " 'Wear Bonnet' got something he thought was kerosene. It was gasoline and it killed two families that time." Blue Thunder Variants I, II, and III: "Wears Hat burned in his bed." The above counts show a man who wears a feather warbonnet.

High Dog: "Good Elk died." The Dakota text reads "Heraka wawaste ta (*Heȟáka-wowàšte* (howaste, ?, JH) *t'a* lit. Male elk-goodness (or good-voiced?) he-died)." Swift Dog: No interpretation. Both counts show an elk with a forked line emanating from his mouth. This seems to indicate that this is the true year of Good-voiced-elk's death and that the Dakota interpretation for the year 1886–87 has been misplaced. Again, however, there could have been two men of this name.

1901–02

Blue Thunder: " 'Hat', a policeman, dies suddenly." No Two Horns: " 'Bonnet' Red Tomahawk's brother died winter." Blue Thunder Variants I, II, and III: "Hat, a policeman died." The above counts show a man wearing an Indian policeman's uniform and badge, plus and eagle feather warbonnet.

High Dog: "Bull Head died." The Dakota text reads "Tataka pa ta (*Tatánka-pa t'a* lit. Buffalo-bull-head he-died)." Swift Dog: No interpretation. Both counts show a man with the name symbol of a bison's head.

1902–03

Blue Thunder: " 'Grey Bear' got hurt. Broke leg. Cut it off, died." No Two Horns: " 'Grey Bear' Police his leg cut off then." Blue Thunder Variants I, II, and III: "Gray Bear police, broke leg, cut off, he died." The above counts show a man wearing an Indian police uniform who has one leg missing. The name symbol of a bear is shown over the man's head.

High Dog: "Buffalo Ghost died." The Dakota text reads "Tataka wamayi ta (*Tatánka-wanàği t'a* lit. Buffalo-bull-ghost he-died)." Swift Dog: No interpretation. Both counts show a man with the name symbol of a bison above his head.

1903–04

Blue Thunder: " 'Little Dog' die." No Two Horns: " 'Little Dog' died winter." Blue Thunder Variants I, II, and III: "Little Dog died." The above counts show a dog with long ears.

High Dog: "A star died (disappeared)." The Dakota text reads "Wicaripi wanjila ta (*Wičánȟpi-wanžìla t'a* lit. Star-only one he-died)." Swift Dog: No interpretation. The last two counts show a representation of a star. The author believes that this was a man's name and that he died during this year. Beede obviously thought that this year's event referred to some astronomical phenomenon.

1904–05

Blue Thunder: " 'White Eagle' died at Berthold, visiting." No Two Horns: " 'White Eagle' and old man died. (Father of Richard White Eagle.)" Blue Thunder Variants I, II, and III: "White Eagle died at Berthold." The above counts show a man with the name symbol of a large bird.

High Dog: "Beaver Shield died." The Dakota text reads "wahacakasapa ta (*Wáhacànka-sàpa t'a* lit. Shield-black he-died)." Swift Dog: No interpretation. The above counts show a man with the name symbol of a feathered black shield. Beede evidently mistook the word sápa, black, for cápa, a beaver. The man's name was Blackshield according to Judge Zahn, who remembers the event.

1905–06

Blue Thunder: " 'Black Bear' policeman, killed by Asst. Farmer, Bristow." No Two Horns: " 'Bear Blacking Himself' shot that winter." Blue Thunder Variants I, II, and III: " 'Black Bear' killed by Bristow (?)." Blue Thunder and the Blue Thunder Variant counts I, II, and III show a man wearing a policeman's uniform with the name symbol of a black bear above him. No Two Horns shows a white bear standing on his hind feet and smearing himself with black paint. The bear wears a police badge.

High Dog: "Rain-in-the-face died." The Dakota text reads "Ite amorojie ta (*Ité-o-magàžu t'a* lit. Face-upon-it-rains he-died)." Swift Dog: No interpretation. The pictograph on these two counts is puzzling. Both show a man with the name symbol of a man's head. The head in the name symbol wears the "enemy" hairdress. Whether this refers to Rain-in-the-face or to some other individual is uncertain.

1906–07

Blue Thunder: "Joe Tomahawk shot himself, suicide." (Note—Son of Marcellus Red Tomahawk, famous Sihasapa, W)." No Two Horns: "Son of Marcellus Red Tomahawk kills himself." Blue Thunder Variants I, II, and III: "Young Hawk's boy Joe suicided." All of the above counts show a man with the name symbol of a red tomahawk. In the No Two Horns counts he is bent over a rifle which he is apparently discharging into his own face.

High Dog: "Feather Hawk died." The Dakota text reads "Ieta wakiyata (*Čétan-wakìnyan t'a* lit. Hawk-thunder he-died)." Swift Dog: No interpretation. Both counts show a man with the name symbol of a bird from which a forked line emanates. This line usually means "crazy" or "holy" in Dakota pictographs, but in this case probably symbolizes thunder and lightning. Beede probably mistook the word wakìnyan, thunder or lightning, for wíyaka, a feather.

1907–08

Blue Thunder: " 'Earth,' mother of Frosted Red Fish, die." No Two Horns: " 'Eagle Claw' woman of Red Fish, dies now." Blue Thunder Variants I, II, and III: " 'Frosted Redfishes' mother died (Maka [Earth, JH])." All of the above counts show a woman with the name symbol of an eagle claw. Frosted-red-fish's alternate name was Eagle-claw, according to Welch (note accompanying interpretation of No Two Horns count, 1888–89), and the eagle claw is his name symbol, not that of his mother.

High Dog: "His-horse-reers died." The Dakota text reads "tasuke iyake ta (*Tašúnke-inyànka t'a* His-horse-runs he-died)." Swift Dog: No interpretation. Both counts show a man with the name symbol of a running horse.

1908–09

Blue Thunder: " 'Two Bears' mother die." No Two Horns: "Mother of Two Bears died winter." Blue Thunder Variants I, II, and III: "2 Bears mother died." The above counts show a woman with the name symbol of two bears' heads.

High Dog: "There was an issue of horses." The Dakota text reads "Syacukaske suwakipamin (*Ínyan-čunkàške šúnka-wakpàmni* lit. Rock-fence horse-issue)." Swift Dog: No interpretation. Both counts depict a horse. The pictograph for this year refers to a Government issue of horses which took place at "Rock fence place" south of Fort Yates, according to Judge Zahn.

1909–10

Blue Thunder: " 'Fly Cloud' prisoner at Fort Yates." No Two Horns: " 'Flying Cloud' was a prisoner at Mandan winter." Blue Thunder Variants I, II, and III: "Flying Cloud a prisoner." The above counts show a man wearing leg shackles and a ball and chain with the name symbol of a cloud above him. This cloud seems to be sprouting wings in the Blue Thunder and Blue Thunder Variant III counts. It has definitely sprouted them in the No Two Horns count.

High Dog: "There was a comet." The Dakota text reads "Wica gipi wan ile yahan (*Wičánḣpi wan ile yahan* lit. Star a burning went-along)." Swift Dog: No interpretation. Both counts show a star or comet with a fiery tail. This was Halley's comet, visible during the years 1908–11, and appearing brightest from April 19, 1910, to June 19 of the same year.

1910–11

Blue Thunder: " 'High Bear' Chief, die." No Two Horns: " 'Tall Bear' die. A chief one time. (Capt. I. P. Paker given his name.)" Blue Thunder Variants I, II, and III: "Chief 'High Bear' died." Blue Thunder and Blue Thunder Variants I, II, and III show a man with the name symbol of a bear. No Two Horns merely shows a bear with very long legs (i. e. "Tall Bear").

High Dog: "Buffalo Fool died." The Dakota text reads "Tata ka witko ta (*Tatánka-wítko t'a* lit. Buffalo-bull-crazy he-died)." Swift Dog: No interpretation. The last two counts show a man with the name symbol of a buffalo.

1911–12

Blue Thunder: " 'Half Body Bear' died." No Two Horns Interpretation missing for this year. Blue Thunder Variants I, II, and III: "Half-body Bear died." The Blue Thunder and Blue Thunder Variant counts I, II, and III show an anthropomorphic creature the upper half of which is a bear. No Two Horns shows a bear with a red line dividing it in half. The High Dog and Swift Dog counts mention the death of "Bear-cut-in-half" for the year 1898–99.

High Dog (this is the last year for this count and its interpretation): "Children had measles and the same year a star burned out." The Dakota texts (there are two of them) read "Wakaheja nasilipi *Wakánhea naslípi* lit. Children epidemic)," and "Wicarpi wan ileyo u kin (*Wičánḣpi wan iléya u kin* lit. Star a burning came the)." Swift Dog (this is the last year for this count): No interpretation. Both counts show a star or meteor with a flaming tail. The High Dog count shows a person with spots on his body as well.

1912–13

Blue Thunder: "Red Dog's wife died." [This interpretation does not fit the picture on the count, JH.] No Two Horns: "Siaka [Šíyaka (?) Teal-duck, JH] 'Scares the Eagle' died winter." Blue Thunder Variants I, II, and III (the Blue Thunder Variant counts I and II end here): "Red Dog's wife died." The Blue Thunder count shows a man with the name symbol of a large bird in flight. No Two Horns shows a similar picture, but the man is running. Blue Thunder Variants I and III show a man with an eagle name symbol, similar to the Blue Thunder count. Blue Thunder Variant II shows an anthropomorphic figure, the top half of which is a red dog.

Blue Thunder Variants I and II end with this year. The parts of the Blue Thunder and Blue Thunder Variant III counts which were drawn in ink by the original artist or artists end here as well. The Blue Thunder and Blue Thunder Variant III counts continue, but after this year the work is apparently the work of several different people. On the whole this later work is either very inferior or else the work of someone who was quite acculturated and sketched in the European manner. On the Blue Thunder count the figures after this year are drawn with a soft pencil and colored with wax crayons, and have become badly smudged.

1913–14

Blue Thunder: "This year call him 'When the soldier was adopted' winter." A note by Welch reads "Note—This was the adoption ceremonies of A. B. Welch." [This is obviously incorrect. There are five pictographs on this count before the one in which Welch appears, JH.] (The interpretation of the Blue Thunder count ends here, although the pictographs continue.) No Two Horns: "Wife of Grey Bear had a bleeding. She died." Blue Thunder Variants I, II, and III (Blue Thunder Variants I and II, which this interpretation supposedly accompanies, ended with the previous year. The interpretation, however, continues for 1 year longer.): "Mrs. Parkins died."

The Blue Thunder, No Two Horns, and Blue Thunder Variant III counts all picture a woman. The Blue Thunder and No Two Horns counts have the name symbol of a bear above her head. The Blue Thunder Variant III count does not show this but has a printed inscription underneath the pictograph reading "Mrs. Mato hota [Grey-bear, JH]." Perhaps this woman's Christian name was "Mrs. Parkins."

1913–14

Blue Thunder: No interpretation. No Two Horns: "White Eagle's Woman was run over by a train at Mandan." Blue Thunder Variant III: No interpretation. The Blue Thunder count shows a woman with the name symbol of a white eagle. No Two Horns shows a graphic scene in which a woman is lying beside a railroad track. The locomotive which is on the track has literally cut her in two. The Blue Thunder Variant III count shows a woman with the name symbol of a white eagle. On this bird's body is printed "White Eagle."

1914–15

Blue Thunder: No interpretation. No Two Horns: "'Good Crow's' woman died then." Blue Thunder Variant III: No interpretation. The Blue Thunder and No Two Horns counts show a woman with the name symbol of a black bird. The Blue Thunder Variant III count shows this as well, but in addition a man who apparently has a shriveled leg. He stands behind the woman.

1915–16

Blue Thunder: No interpretation. No Two Horns: " 'Holy Bear' die then." Blue Thunder Variant III: No interpretation. The Blue Thunder count shows a man with the name symbol of a bear. Wavy lines emanate from the bear's nose, probably carrying the idea of "holy." No Two Horns shows a man wearing a warbonnet and carrying a sword who has a name symbol similar to that in the preceding count. Blue Thunder Variant III shows an anthropomorphic figure, the top half of which is a bear. Wavy lines emanate from this creature's nose.

1916–17

Blue Thunder: No interpretation. No Two Horns: " 'Bent Horn' winter die." Blue Thunder Variant III: No interpretation. The Blue Thunder count shows a man with a name symbol of a bison's head. This bison has extremely long curved horns. No Two Horns shows a man with the name symbol of a pair of long curved bison horns. Blue Thunder Variant III shows a man in white man's clothing who has the name symbol of a bird above him. This count is probably recording a different event.

1917–18

Blue Thunder: No interpretation. No Two Horns: " 'Mato Watakpe' (Charging Bear) returns from over the Ocean War winter. Many ceremonies then." Blue Thunder Variant III: No interpretation. The Blue Thunder count shows a man in an elaborate Indian chief's costume who has the name symbol of a bear above his head. Wavy lines emanate from the nose of the bear. No Two Horns shows a similar picture, but there are no wavy lines coming from the bear's muzzle. These two counts, and perhaps the Blue Thunder Variant III count as well, refer to the adoption ceremonies in which Major A. B. Welch, of Mandan, N. Dak., was made a member of the Dakota tribe. Welch was given the name "Charging Bear" by the Dakota. Among other honors Welch was formally instated in the Čanté T'ìnza or Strong-heart warrior society. The Blue Thunder Variant III count shows a man in soldier's uniform holding a rifle at port arms. He is represented as being wounded in the arm and the right leg. The words "Tatanka nasin [Tatánka-nàzin lit. Buffalo-bull-standing, JH]" are written under the pictograph.

1918–19

Blue Thunder: No interpretation. No Two Horns: " 'Strikes Many' die that time winter." Blue Thunder Variant III: No interpretation and apparently no pictograph. The Blue Thunder count shows a man who has been wounded several times on the body. Around him are what are apparently representations of Indian quirts (signifying the name "Many-strikes"?). No Two Horns shows a similar scene. Blue Thunder Variant III seems to omit a year here, as the "Silk" incident is the next one given. This "Silk" pictograph is labeled "1920" which seems to place it with the counts for the next year

1919–20

Blue Thunder: No interpretation, and apparently no pictograph. No Two Horns: " 'Silk' accidentally shot his woman in the head. She die." Blue Thunder Variant III: No interpretation. The Blue Thunder count apparently omits a year here, as the next pictograph on this count after the "Strikes-many" event shows a man with the name symbol of an eagle claw, which seems to correlate with the other two counts for the following year. No Two Horns shows a woman with a wound in her head. Blue Thunder Variant III shows a rather popeyed man in the act of discharging a gun at a woman who has a wound in her head. Apparently the man's popeyedness is intended to show his horror at what is taking place and to convey the idea that the death was accidental. Between the figures of the man and the woman is what appears to be a cattle brand or a monogram. Beneath the pictograph is the inscription "1920, Mrs. Harry Silk."

1920–21

Blue Thunder: No interpretation. No Two Horns: " 'Tree Top' (Jack) die. Indian name Bear Claw." Bluf Thunder Variant III: No interpretation. The Blue Thunder and No Two Horns counts show a man with the name symbol of a bear's clawed foot. Blue Thunder Variant III shows a large dark rectangle, inside of which is a woman's profile and the words "Winyan waste [lit. Woman-good, JH.]" This last pictograph obviously refers to some different incident than the other two counts.

1921–22

Blue Thunder: (The Blue Thunder count concludes with this year.) No interpretation. No Two Horns: (The No Two Horns count and its interpretation end with this year.) " 'Frosted Red Fish' die in Mandan hospital. Indian name Eagle Claw." Blue Thunder Variant III: No interpretation.

The Blue Thunder and No Two Horns counts show a man with the name symbol of an eagle claw. Blue Thunder Variant III shows a small sketchy drawing of a human figure with the name symbol of what appears to be a saddle. The inscription "1922 Octxnti [?, JH]" is printed under the pictograph. The author has been unable to relate this term to any word in the Dakota language.

1922–23

Blue Thunder Variant III: No interpretation. The Blue Thunder Variant III count shows a man with the name symbol of a bird which has wavy lines emanating from its beak in a rough V shape. This is the common method of designating the thunderbird in Dakota pictographs. The inscription "1923" is printed beneath this drawing.

1923–24

Blue Thunder Variant III: No interpretation. The Blue Thunder Variant III count shows a man sitting in a yellow tipi. Whether this is a year pictograph or merely the pictograph of a former owner of the count is not certain. Evidence against its being an ownership pictograph is that the style of drawing differs from that used on the majority of the pictographs on the count and that it is upside down in relation to the beginning years of the count. Evidence for its being an ownership pictograph are that a winter count was once kept by a man named Yellow-lodge, and that there is no date written underneath this drawing, although dates are written beneath the pictographs both preceding and following it.

The author's personal opinion is that it is a year pictograph. The pictograph following this one is dated with "John P. Pleets, Died Nov. 20, 1924." This would indicate that the preceding pictograph, this one, would be for the year preceding, 1923–24, and that Pleet's death was the event selected for 1924–25.

1924–25

Blue Thunder Variant III: No interpretation. The Blue Thunder Variant III count shows a figure with a human body and a bison's head. The figure wears white man's clothing. Beneath the pictograph is the inscription "John P. Pleets, Died Nov. 20, 1924."

1925–26

Blue Thunder Variant III: No interpretation. The Blue Thunder Variant III count shows a man wearing white man's apparel. Above his head is the name symbol of what appears to be a smoking cloud. Underneath the pictograph is the inscription "Mahpiya Peta [lit. Cloud-fire, JH] 1925."

1926–27

Blue Thunder Variant III: No interpretation. The Blue Thunder Variant III count shows a small anthropomorphic figure with the head and upper body of a bison.

1927–28

Blue Thunder Variant III: No interpretation. The Blue Thunder Variant III count shows a reclining man with the name symbol of a red bird.

1928–29

Blue Thunder Variant III: No interpretation. The count shows a man wearing the modern "northern style" Grass dance costume. In his hand he carries a dance mirror in a wooden frame. Above his head is the name symbol of what appears to be a bald eagle. Below the pictograph is the inscription "Eugene Gray Eagle, Died Feb 5th 1929."

1929–30

Blue Thunder Variant III: No interpretation. The count shows a man wearing a long winter overcoat, a fur cap and mittens, and carrying a cane. He has the name symbol (?) of a sun and some clouds above him. Below the pictograph is the inscription "Frank Gates, Died Dec 1929."

1930–31

Blue Thunder Variant III (the concluding year for this count): No interpretation. This count shows a small old woman wrapped in a shawl and bent over a cane. Beneath the pictograph is the inscription "Mrs. Shave One Side, Died Jan 1, 1931."

LITERATURE CITED

BECKWITH, MARTHA WARREN.

1938. Mandan-Hidatsa myths and ceremonies. Mem. Amer. Folk Lore Soc., vol. 32. New York.

COHEN, LUCY CRAMER.

1939. Big Missouri's winter count—A Sioux calendar, 1796–1926. Indians at Work, Feb. 1939. Washington.

1942. Swift Bear's winter count. Indians at Work, Jan., Feb., and March 1942. Washington.

CURTIS, EDWARD S.

1908. The North American Indian. Frederick W. Hodge, ed. Vol. 3. Cambridge, Mass.

DENSMORE, FRANCES.

1918. Teton Sioux music. Bur. Amer. Ethnol. Bull. 61.

HOWARD, JAMES H.

1954. Yanktonai Dakota eagle trapping. Southwestern Journ. Anthrop., vol. 10, No. 1.

MALLERY, GARRICK.

1877. A calendar of the Dakota Nation. United States Geol. and Geogr. Surv. Bull. 2, No. 1.

1886. The Dakota Winter Counts. *In his* Pictographs of the North American Indians. 4th Ann. Rep. Bur. [Amer.] Ethnol., 1882–83, pp. 89–127.

1893. Winter Counts. *In his* Picture-writing of the American Indians. 10th Ann. Rep. Bur. [Amer.] Ethnol., 1888–89, pp. 266–328.

MOONEY, JAMES.

1898. Calendar history of the Kiowa. 17th Ann. Rep. Bur. Amer. Ethnol., 1895–96.

RIGGS, STEPHEN R.

1890. A Dakota English dictionary. United States Geol. and Geogr. Surv. Rocky Mountain Region, vol. 7. Washington.

ROBINSON, WILL G.

1951. Oahe. Wi-Iyohi, vol. 4, No. 11, Feb. 1.

RUSSELL, FRANK.

1908. The Pima Indians. 26th Ann. Rep. Bur. Amer. Ethnol., 1904–05.

VESTAL, STANLEY (WALTER S. CAMPBELL).

1934 a. Warpath . . . . Boston and New York.

1934 b. New sources of Indian history, 1850–91. Norman, Okla.

WILLIAMSON, JOHN P.

1908. An English-Dakota dictionary. New York.

PHONETIC TABLE

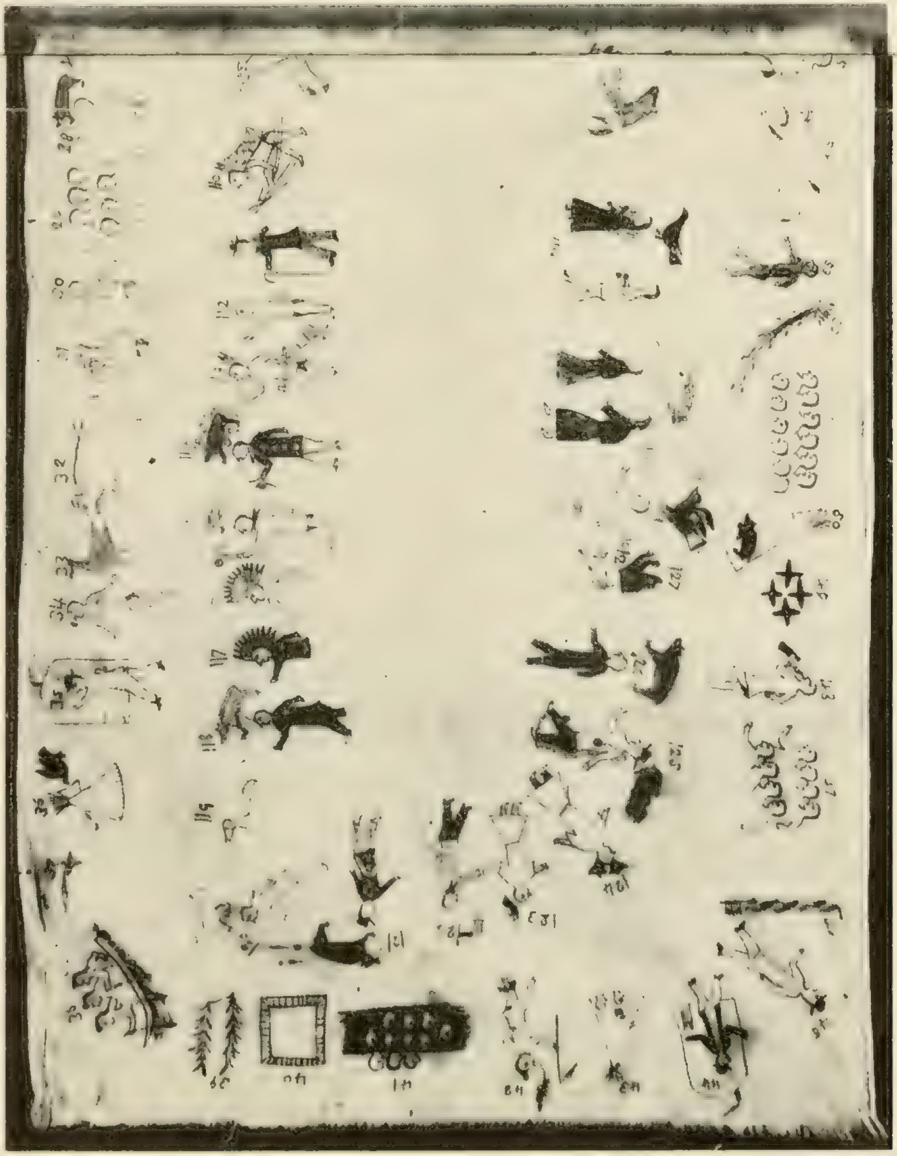
General type of nonvocoid		*Bilabial*	*Alveolar*	*Alveopalatal*	*Velar*	*Back velar*	*Pharyngeal*
Stops	vl.	p	t		k		
Unaspir	vd.	b			g		
Aspir	vl.	p^h	t^h		k^h		
	vd.						
Affric	vl.			č			
	vd.			j			
Fricatives							
Flat	vl.					ḣ	h
	vd.					ġ	
Grooved	vl.		s	š			
	vd.		z	ž			
Frictionless							
Nasal	vl.						
	vd.	m	n				
Lateral	vl.						
	vd.		l				

Vowels

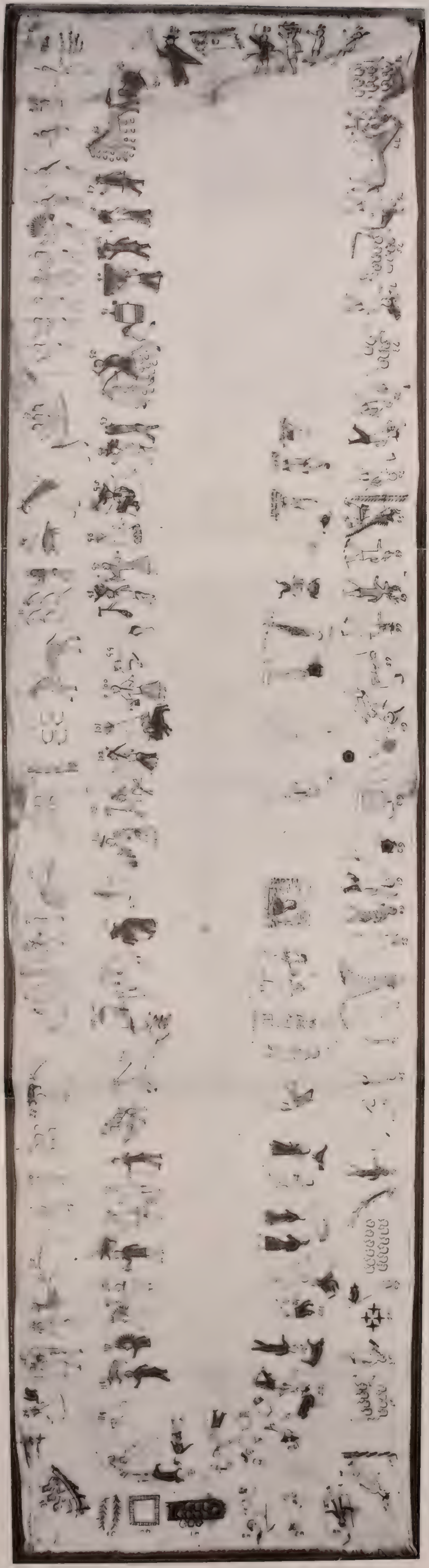
Oral	i (y)	e	a	o	u (w)
Nasalized	i^n		a^n		u^n

An apostrophe (’) indicates a glottal stop.

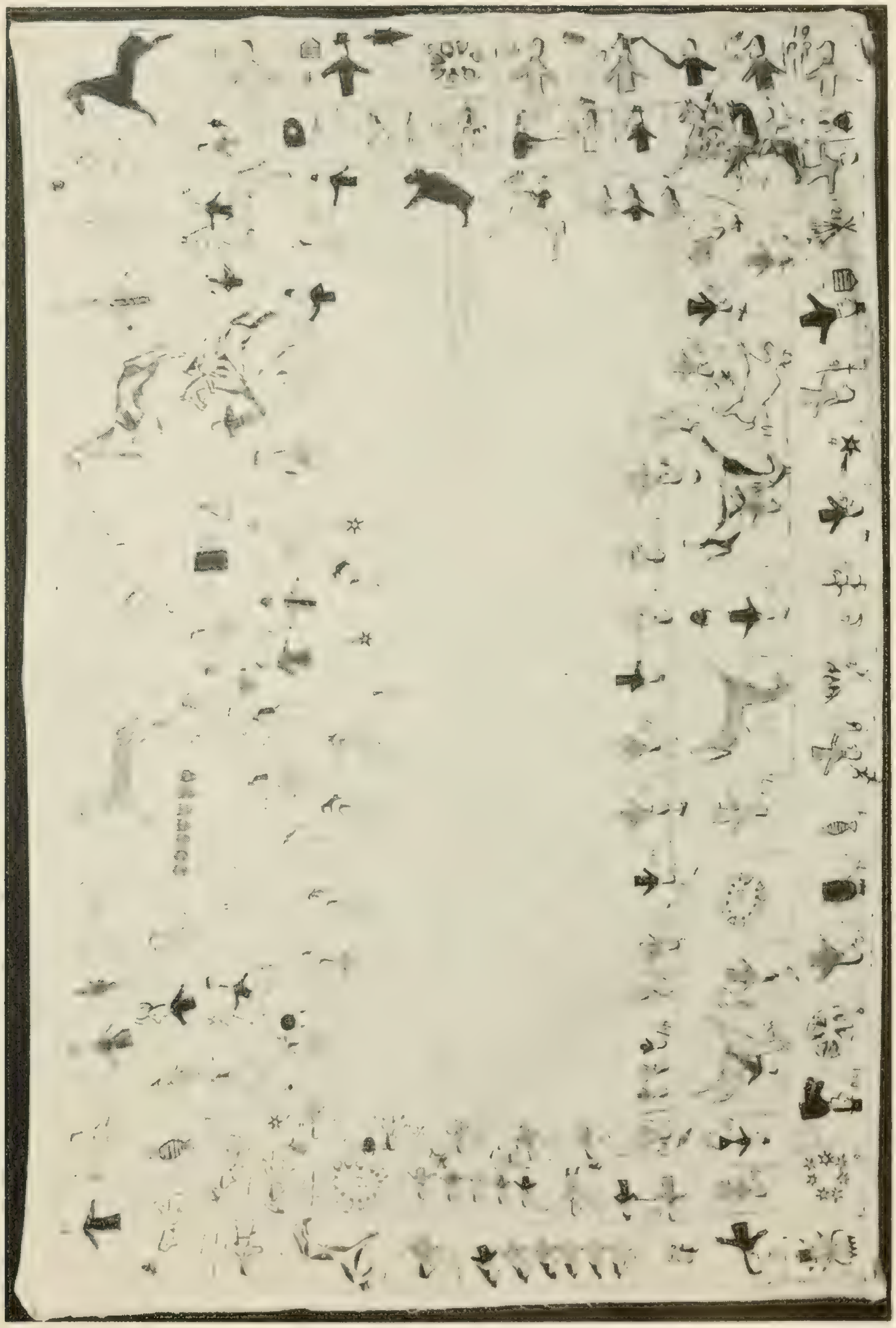
The symbol (′) indicates a primary accent; (ˋ) secondary accent.



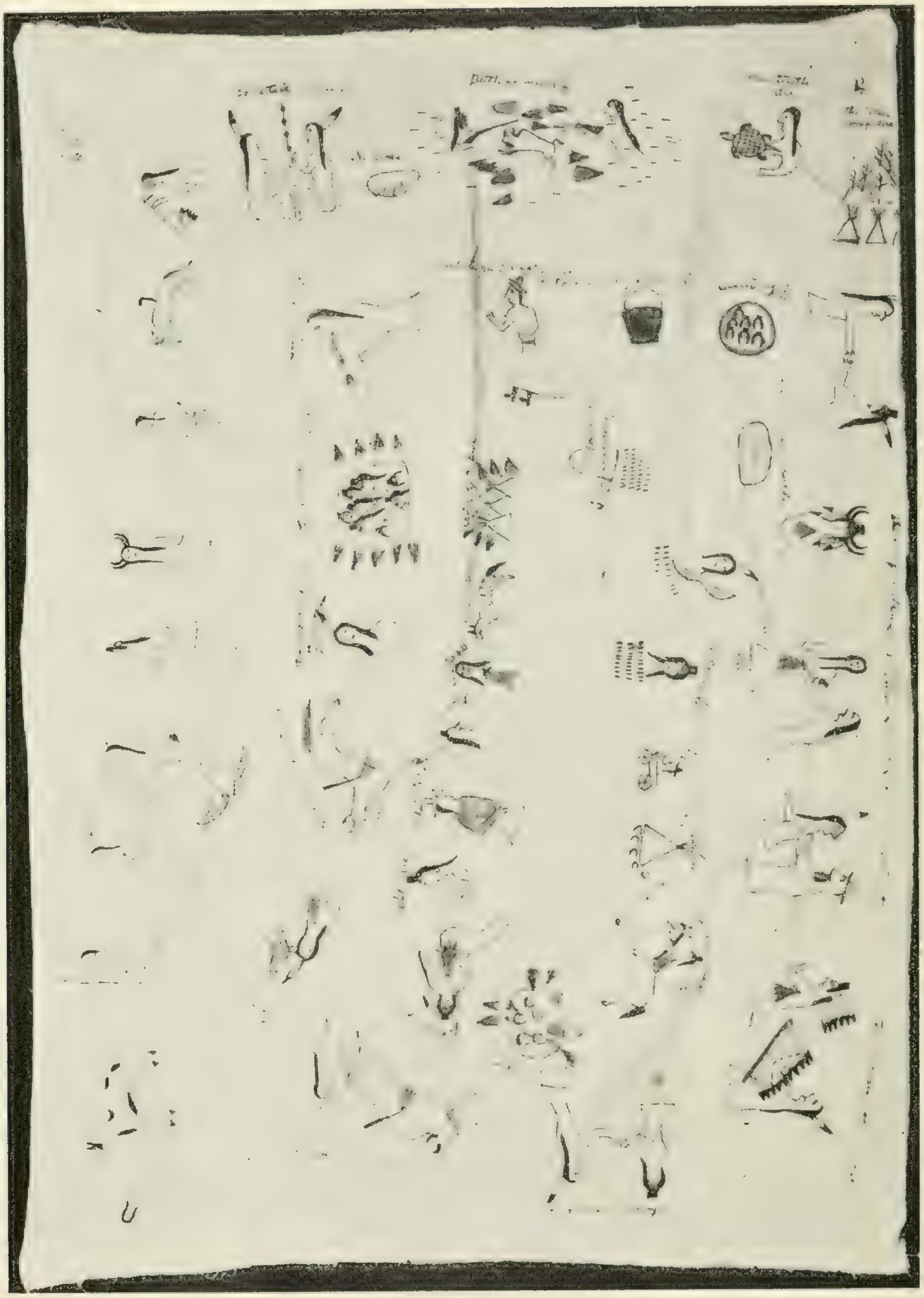
Blue Thunder Variant III (Yellow Lodge) winter count.



Blue Thunder Variant III (Yellow Lodge) winter count.



Swift Dog's winter count (No. 674).



Jaw's winter count.

SMITHSONIAN INSTITUTION
Bureau of American Ethnology
Bulletin 173

Anthropological Papers, No. 62

STONE TIPI RINGS IN NORTH-CENTRAL MONTANA AND THE ADJACENT PORTION OF ALBERTA, CANADA: THEIR HISTORICAL, ETHNOLOGICAL, AND ARCHEOLOGICAL ASPECTS

By THOMAS F. KEHOE

CONTENTS

PAGE

Introduction ---- 421
Historical evidence ---- 424
Ethnological considerations ---- 429
  Blackfoot informants ---- 429
  Informants of other tribes ---- 436
Archeological considerations ---- 437
  Introduction ---- 437
  Environmental factors ---- 438
  Ethnological background ---- 439
  Archeological fieldwork ---- 440
Discussion ---- 456
Conclusions ---- 462
Appendix. A Modern Blackfoot Camp ---- 464
Literature cited ---- 471

ILLUSTRATIONS

PLATES

FOLLOWING PAGE

48. *a*, Site 24GL390, Boulder-lined fire hearth. *b*, Adam White Man in doorway of his father's tipi ring ---- 474
49. *a*, Site 24GL520. *b*, Site 24GL490 ---- 474
50. *a*, Site 24GL486. *b*, Site 24GL487, ring 1 ---- 474
51. *a*, Site 24GL487, ring 4. *b*, Site 24GL486, ring 4 ---- 474
52. *a*, Site 24GL486, ring 4, fire hearth. *b*, Site 24GL486, ring 4, squares 2L1 and 2L2 ---- 474
53. *a*, Site 24GL486, ring 4, squares 1L1, 2L1, and 2L2. *b*, Fasting shelter of Ear Rings ---- 474
54. *a*, Site 24GL520. *b*, Blackfoot woman repairing Lodge 26, 1956 Blackfoot camp ---- 474
55. *a*, Aerial view of 1956 Blackfoot encampment. *b*, Site 24GL350, whitewashing tipi rings ---- 474
56. *a*, Aerial view of Site 24GL350. *b*, Aerial view of Lodges 2 to 12 and 39, 1956 Blackfoot camp ---- 474
57. *a*, Inside view, Lodge 26, 1956 Blackfoot encampment. *b*, Outside view, Lodge 26, 1956 Blackfoot encampment ---- 474
58. *a*, Tipi ring of Lodge 26, 1956 Blackfoot encampment. *b*, Tipi ring of Lodge 14, 1956 Blackfoot encampment ---- 474
59. *a*, Mary Ground in tipi ring of Lodge 30, 1956 Blackfoot camp. *b*, Tipi ring of Lodge 30, 1956 Blackfoot encampment ---- 474
60. *a*, Closeup view of tipi ring, Lodge 30, 1956 Blackfoot camp. *b*, Lodge 2, 1956 Blackfoot encampment ---- 474
61. *a*, Children's play tipi, Lodge 39, 1956 Blackfoote ncampment. *b*, Tom Horn's family and tipi, Blackfeet Reservation, 1910 ---- 474

TEXT FIGURES

PAGE
29. Site 24GL422 (tipi ring of White Man) 431
30. Site 24GL390 448
31. Site 24GL584, ring 5 450
32. Section of Milk River Ridge slope with three tipi-ring sites 451
33. Site 24GL486 452
34. Site 24GL486, ring 4 453
35. Site 24GL520, tipi rings associated with bison drive 461
36. Sites showing tipi-ring camp patterns 465
37. Camp plan, 1956 Blackfoot encampment, Browning, Mont 466

MAP

2. Map of the Blackfeet Reservation showing sites (facing) 421

471762 O - 60 (Face p. 421)

STONE TIPI RINGS IN NORTH-CENTRAL MONTANA AND THE ADJACENT PORTION OF ALBERTA, CANADA: THEIR HISTORICAL, ETHNOLOGICAL, AND ARCHEOLOGICAL ASPECTS

By Thomas F. Kehoe

INTRODUCTION [1]

The casual visitor to certain parts of Montana and Alberta, Canada, will often wonder about the original purpose of stone circles encountered here and there on the open plains. When one leaves the well-traveled highways and strikes off across country unbroken by the plow, clusters of stone circles are likely to appear, often in considerable numbers. These circles are formed of small boulders placed at intervals to form rings ranging from 5 to over 40 feet in diameter. These rings will in most cases be deeply embedded in the sod, suggesting that a considerable period of time has elapsed since they were originally laid down. Local residents long ago adopted the name "tipi rings" for these phenomena.

Scrutiny of the writings of contemporary archeologists reveals confusion and uncertainty concerning the function of tipi rings. In the first review of Montana prehistory, Mulloy (1952, p. 137) classifies them as "manifestations of unknown relationships." He regards "it as implausible that they were used to secure the edges of a skin lodge, even though they are repeatedly referred to as having this function." He is led to this decision by variability in size and a lack of habitation

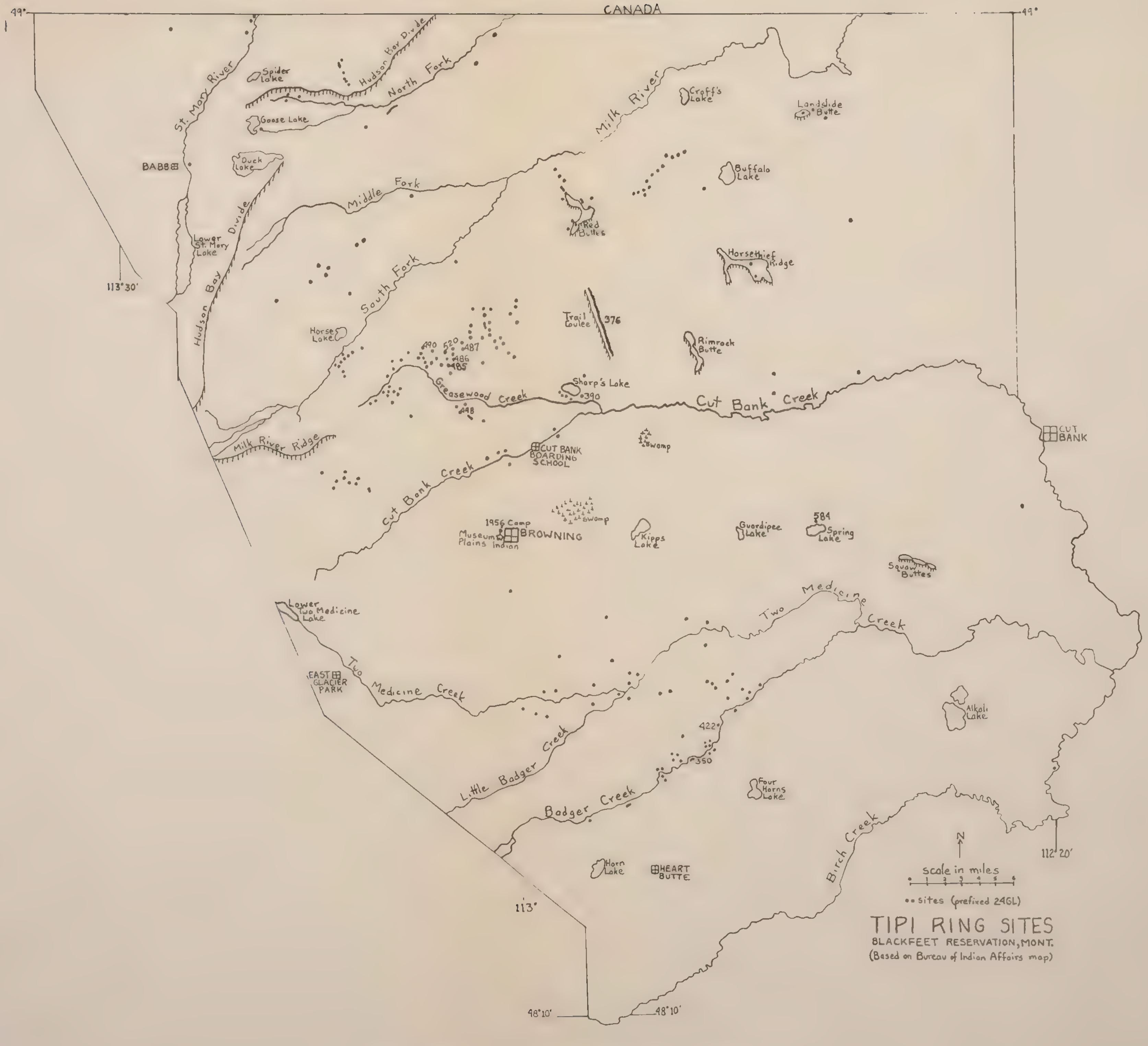
---

[1] I wish to extend my appreciation to the following persons who have greatly aided me in this study: Dr. Claude E. Schaeffer, former curator of the Museum of the Plains Indian, who called my attention to the problem and contributed suggestions from his own experience in Plains ethnography; Dr. Schaeffer and John C. Ewers, who carefully reviewed the historical and ethnological sections; Dr. Douglas Osborne, who did the same for the archeology; and Drs. Osborne, William Elmendorf, and William Massey, who read the manuscript in its entirety.

I am also indebted the Bureau of Indian Affairs, the Museum of the Plains Indian, and the Louis W. and Maud Hill Family Foundation for making possible the 4 years of research on tipi rings.

Sincere thanks are due to Peter H. Baez, Verl P. Brady, and Carl Shaddox, formerly with the Soil and Moisture Conservation Office; to Charles Gerard, of the Forestry Office of the Blackfeet Indian Agency; to Kenneth Galbreath, of Browning; and especially to F. Earl Turner, of the Geology Department of the Union Oil Company of California, for their assistance in locating tipi ring sites.

Finally, I wish to express my gratitude to those who helped me in the excavations involved in this project: Donald and Jerry Ziegler, Edward and Phyllis Jay, and my wife Alice.


CANADA
49°
49°
St. Mary River
Spider Lake
Hudson Bay Divide
North Fork
Goose Lake
Milk River
Croff's Lake
Landslide Butte
BABB
Duck Lake
Middle Fork
Buffalo Lake
Lower St. Mary Lake
Hudson Bay Divide
Red Buttes
Horsethief Ridge
113°30'
South Fork
Trail Coulee
376
Rimrock Butte
Horse Lake
490
520
487
486
485
Sharp's Lake
390
Greasewood Creek
448
Cut Bank Creek
CUT BANK
Milk River Ridge
swamp
CUT BANK BOARDING SCHOOL
Cut Bank Creek
swamp
1956 Camp
Museum Plains Indian
BROWNING
Kipps Lake
Guardipee Lake
584
Spring Lake
Squaw Buttes
Lower Two Medicine Lake
Two Medicine Creek
EAST GLACIER PARK
Two Medicine Creek
Alkali Lake
Little Badger Creek
422
350
Four Horns Lake
Badger Creek
Birch Creek
N
112°20'
scale in miles
0 1 2 3 4 5 6
• • sites (prefixed 24GL)
Horn Lake
HEART BUTTE
113°
TIPI RING SITES
BLACKFEET RESERVATION, MONT.
(Based on Bureau of Indian Affairs map)
48°10'
48°10'

Map 2.—Map of the Blackfeet Reservation showing sites.

471762 O - 60 (Face p. 421)

remains in their vicinity. Factors contributing to the latter premise are (1) the rare occurrence of fire remains within the circle, (2) the lack of packed floors, and (3) more frequent location on high river terrace fingers than in sheltered lowlands. Mulloy further notes that the stone circles range from isolated individual rings to groups of several hundred, sometimes intersecting one another or occurring in eccentric forms. In the Dakotas, he points out, they are found as merely circular depressions in the sod. Mulloy refuses to commit himself as to the original purpose of the circles, but believes that they are related to the so-called "medicine wheels," an example of which is found high on a mountain peak in the Big Horn Mountains of Wyoming.

In a review of the book containing Mulloy's comment cited above, Wedel (1953, p. 179) states the following:

> Other interesting and puzzling subjects include tipi rings, various boulder alignments and configurations, and petrographs. Mostly these are still unassigned culturally, because associated cultural-diagnostic materials are rare or absent. I am inclined to agree with Mulloy that a good many of the tipi rings are probably of ceremonial, rather than practical, purpose.

Previously Wedel (1948, p. 48) had discussed the origin and significance of tipi rings and included a useful statement on their distribution:

> The so-called tipi rings, whose true purpose and significance are still obscure, are abundant and apparently highly characteristic. They occur in limited numbers in northern Colorado and extreme western Nebraska, and more frequently in the Dakotas eastward approximately to the Missouri from Fort Randall northward, but the greatest number of such sites seem to lie in Wyoming, Montana, and northward. It is possible that they correlate with a relatively late hunting occupation, perhaps partly at least involving Shoshonean peoples.

In a recent study of tipi rings in Montana, the Dakotas, and Wyoming, Hoffman (1953, p. 2) observes that their "nature and use is highly controversial." He lists what he terms the most common theories concerning their purpose: (1) Occupational remains, (2) ceremonial or religious remains, (3) remains once associated with games, and (4) a combination of (1) and (2). As occupational debris, Hoffman believes that they represent the site of the recent conical skin lodge or a crude hogan of earlier times. In connection with a ceremonial or religious function, he speculates on their use in a "medicine getting" ritual, on the basis of statements made by a "Lacotah Sioux Indian" named Judge Zahn, of Fort Yates, S. Dak. Judge Zahn remarked that "a person would go up a hill and build a circle of rocks in which he would sit and pray and fast until he got his medicine" and added that "tipis were never held down by rocks, always staked." In this connection it would be useful to know the identity of the judge quoted and the authority for his assertions. Hoffman goes on to cite other instances in which Kutenai, Flathead, and Upper Pend d'Oreille Indians have ventured similar information on rock-shelter fasting places. He concludes (p. 5), "These points can lead us to only one definite conclusion: the nature and use of tipi rings is highly conjectural."

Carling Malouf (personal letter dated November 7, 1953), who has a number of ideas incorporated in the Hoffman paper, believes that the rings are both domestic and ceremonial, and that they are associated with some sort of conical structure. He says that none or few of them seem to have been occupied for any length of time, since hearths and specimens are lacking. In an unpublished manuscript on Montana archeology, Malouf adds:

> Although their presence has been widely recognized very little is really known about them [tipi rings]. It is not even certain that they had any connection with the use of a tipi. Ethnographical accounts fail to give any sound information on them, hence, they must be of considerable age. Yet, archeology indicates that some of them were made in recent times.

In a recent review of Plains prehistory, Jennings (1948, p. 69) states that "too little is known of these features [tipi rings] to permit very intelligent speculation about them, so no mention of them appears elsewhere in the text." In a glossary, however, the same author admits, "These stones have been interpreted as evidence that a skin tipi had been erected at the spot, the stones having been used to hold down the edge of the tent."

Survey work in Alberta has given Wormington this view on the topic, as reported by Krieger (1956, p. 450):

> Near Neutral Hills, Mulloy and Judd were shown a number of large groups of stone rings similar to those found in Montana and Wyoming and commonly called "tipi rings." Wormington, however, doubts that they represent habitations and suggests they had ceremonial significance.

These varied opinions expressed on the function of tipi rings call for a reexamination of the evidence. It is clear that certain of these students have brought together, under the name of tipi rings, dissimilar prehistoric remains from diverse areas and attempted to assign to them identical functions.

Despite the recent increase in archeological knowledge of the Northern Plains, the question of the origin and function of stone "tipi rings" seems as far from solution as ever. This is particularly true in respect to the original purpose which these seemingly mysterious stone circles served. Modern students of Plains prehistory hesitate to assign a use to them or else waver between practical and esoteric types of utilization. Sufficient information exists in historical and ethnological records, it is believed, to reveal their function, if not their ethnic origin. The latter remains a task for the archeologist or ethnohistorian. It is the theme of this study that "tipi rings," in one part of the Northern Plains, at least, represent just what their popular name suggests: rings of stone employed by former resident Indians to hold down the periphery of their skin lodges. In support of this thesis we have assembled in this paper evidence from documentary and traditional sources as well as from archeological work clarifying the significance of these stone circles.

HISTORICAL EVIDENCE

From the beginning of the 17th century, when the earliest European visitors first entered the Northern Plains, the area has been traversed by a constant stream of explorers, traders, trappers, and pioneers who provided eyewitness descriptions of the native peoples in various stages of acculturation. From some of these early visitors we obtain the first accounts of tipi rings or circles of boulders. The use of stone or other weights by the Blackfoot and their neighbors to hold down their lodges is established by a number of references in the literature, several of them by first-hand observers.

Maximilian (1906, p. 104), who saw the Blackfoot at Fort McKenzie during the summer of 1833, has left a very concise account of their method of holding down lodge covers. In this case they appear to have used blocks of sod rather than stone, possibly because of the scarcity of stone in the vicinity. He writes:

> When these tents are taken down, they leave a circle of sods, exactly as in the dwellings of the Esquimaux. They are often surrounded by fifteen or twenty dogs, which serve, not for food, but only for drawing and carrying their baggage.

The circles of earth indicating the former position of lodges were again noticed by Maximilian while at Fort Union, at the mouth of the Yellowstone, October 16, 1833. The abandoned camp was probably left by Assiniboin or Cree. He noted (1906, p. 199):

> The little prairie fox was so hungry, and, therefore, so tame, that it often visited the environs of the fort, and we found these pretty little animals among the circles of turf which were left on the removal of the Indian tents. [2]

The expedition under Henry Y. Hind exploring west of the Red River noticed, in the summer of 1858, both numerous groups of Cree hunters and former camps of that tribe. The narrative mentions (Hind, 1860, vol. 1, pp. 338–341):

> Immediately on the banks of the Qu'appelle Valley near the "Round Hill" opposite Moose Jaws Forks, are the remains of ancient encampments, where the Plains Crees, in the day of their power and pride, had erected large skin tents, and strengthened them with rings of stones placed round the base. These circular remains were twenty-five feet in diameter, with the stones or boulders

---

[2] Speck (1928, pp. 39, 40) photographed Sioux standing before their lodges, which appear, although the details are not too clear, to be held down by sod piled on the lower edge.

> being about one foot in circumference. They wore the aspect of great antiquity, being partially covered with soil and grass. When this camp ground was occupied by the Crees, timber no doubt grew in the valley below, or on the prairie and ravines in detached groves, for their permanent camping grounds are always placed near a supply of fuel. . . .
>
> Buffalo Pound Hill Lake, sixteen miles long, begins near Moose Jaws Forks, and on the opposite or south side of this long sheet of water, we saw eighteen tents and a large number of horses. . . . On the banks of the valley the remains of ancient encampments in the form of rings of stones to hold down the skin tents are everywhere visible, and testify to the former numbers of the Plains Cree. . . . The largest ancient encampment we saw lies near a shallow lake in the prairie about a mile from the Qu'appelle Valley. It is surrounded by a few low sandy and gravelly hills, and is quite screened from observation. It may have been a camping ground for centuries, as some circles of stone are partially covered with grass and embedded in the soil.

Bushnell (1922, p. 21) comments briefly on the origin of the circles of stones observed by the Hind party:

> This is a simple explanation of small circles of stones now encountered in different parts of the country, but in other localities, where stones were not obtainable, masses of sod were used for the same purpose, and these in turn may have caused the small earth circles which are now discovered in the lower Mississippi Valley and elsewhere.

That the use of boulders to secure lodge covers was still extant by 1866 is attested to by Dr. Washington Matthews, in a discussion of the paper, "Stone Monuments in Southern Dakota," by T. H. Lewis, read at the meeting of the Anthropological Society, February 5, 1889 (Lewis, 1889, pp. 164–165):

> Dr. Matthews said that . . . he could not speak for the particular circles of stones to which Mr. Lewis refers; but he was certain that many stone circles in Dakota were to be attributed to the former use of bowlders in holding down the edges of skin tents. He had seen bowlders used for this purpose in Dakota twenty-three years ago, while the Indians still followed the nomadic life. The fact that some circles were only eight feet in diameter did not militate against this theory, since the Indians used small lodges as sweat-houses and for sacerdotal purposes.

In the paper that elicited this discussion, Lewis mentioned (Lewis, 1889, p. 162):

> The Indians claim that the stone circles mark the places where in former times the tepees of their people were located, and that the bowlders held down the edges of the skin tents in place.

A subsequent article on the same general subject contained this statement (Lewis, 1890, p. 274):

> There can be no doubt that the Indians used bowlders and stones to hold down the edges of their tents or tepees.

Lewis also quotes an observation made by J. N. Nicollet, who "visited southern Minnesota in 1838" (Lewis, 1890, p. 272), on page 12 of his "Report Intended to Illustrate a Map of the Hydrographic

Basin of the Upper Mississippi River" (Washington, January 11, 1845) (ibid.):

> One mile from the *Traverse des Sioux*, and on the bank of the river, are the remains of an Indian camp; the circular area of which is still indicated by the heaps of stones around each lodge.

While engaged in fieldwork for the Geological Survey of Canada, George M. Dawson [3] made the following note from observations in the Sweet Grass Hills in 1874 (Dawson, 1875, p. 297):

> The country surrounding the Buttes [Sweet Grass Hills] is said to have been for a long time a neutral ground between various tribes of Indians. That it has been so is evidenced by the almost complete absence of the circles of stones marking camping places. The region is at present a debatable ground between the Blackfeet, Peigans and the Bloods of the west; the Sioux and the Assiniboines of the east, and the Crows and other tribes of the Upper Missouri. It is not passed through save by war parties strong in numbers and travelling rapidly. Ten miles north of the Middle Butte the bodies of over twenty Crow Indians were found unburied on the scene of a conflict.

Sir Cecil Denny, an original member of the Northwest Mounted Police and Agent of the Blood Reserve in 1881–82, came west in 1874. In an unpublished manuscript (pp. 148–149) he notes the abundant occurrence and the original purpose of tipi rings found on the prairie:

> Rings of boulders or smaller stones will be found in hundreds on the prairie, and the curious will often wonder as to their origins. The stones will in most cases be covered by sod, showing that long periods of time must have elapsed since they were placed there.
>
> Long ago, before the Indians of the plains obtained steel axes and hatchets, they were unable to cut and sharpen the stakes and to fasten down their lodges. These stones picked up on the prairie were used for this purpose, and on the tents being moved these rings of stone were left, and in the course of ages became covered with soil. Often if the inside of these rings be dug over, stone arrowheads and other stone implements will be discovered.

Upon visiting the Blackfoot and Blood tribes near Fort Macleod in the summer of 1880, John McLean became acquainted with those Indians' practice of weighting down their lodge covers with rocks. He described the custom and notes the erroneous explanation of the origin of the rings by inexperienced travelers in the region (McLean, 1896, p. 577):

> Riding carelessly over the prairie with a young man who had lately arrived from the Old World, my companion called my attention to a circle of stones. "That is a mark," said he, "placed there to commemorate a great battle that was fought between different tribes of Indians." Oftentimes had I seen these circles on the prairie, and knowing the cause of their construction, I was amused at this display of apparent wisdom. These circles are to be found on our western prairies. As the Indians traveled on their hunting expeditions, they placed stones around the edges of the lodges when they camped, to prevent the wind from over-turning them, and to keep them warm. This is shown by the outer circle of stones. In

---

[3] I am indebted to Hugh Dempsey, Calgary, Alberta, for the Dawson and Denny references.

> the centre of the lodge the fire was made, and to keep the fire from spreading and to adapt it for cooking purposes, a small circle of stones was placed which confined the fire. When the camp was moved the circles of stones were left, and that which we saw was one of the circles. . . .
>
> In the brush fringing the rivers of the west stone circles, deeply imbedded in the soil, are found, linking the past with the present.

An eyewitness account of the use of stones by the Blackfoot to hold down lodge margins was given by John R. Barrow, a Wisconsin youth in Montana in 1880–82. The camp was that of Running Rabbit and his followers (Phillips, 1927, p. 9):[4]

> The typical tepee was a conical lodge of specially tanned elkskin stretched over a framework of perhaps twenty-five skin peeled lodge-pole pine. The bottom of the tepee was held down by stones.

Schultz, who lived in Montana during the last decades of the 19th century, speaks of stone circles marking the encampments of winter hunters (Schultz, 1907, p. 63):

> You have perhaps noticed on the northwestern plains, circles of stones or small boulders, varying in size from twelve to twenty and more feet in diameter. They were used to weight the lower edge of lodge skins, to prevent the structure being blown over by a hard wind, and when camp was moved they were simply rolled off the leather. Many of these circles are found miles and miles from any water, and you may have wondered how the people there encamped managed to assuage their thirst; they melted snow; their horses ate snow with the grass; buffalo chips were used for fuel. The stone circles mark the place of an encampment of winter hunters in the long ago. Some of them are so ancient that the tops of the stones are barely visible above the turf, having gradually sunk into the ground of their own weight during successive wet seasons.[5]

George Bird Grinnell talked to the older men of the Blackfoot tribes in the years immediately preceding 1890. He collected the following data on circles of stones (Grinnell, 1892, p. 198):

> In ancient times, before they had knives of metal, stones were used to hold down the edges of the lodge, to keep it from being blown away. These varied in size from six inches to a foot or more in diameter. Everywhere on the prairie, one may now see circles of these stones, and, within these the smaller ones, which surrounded the fireplace. Some of them have lain so long that only the tops now project above the turf, and undoubtedly many of them are now buried out of sight.

The age of the use of stones as lodge-cover weights is indicated by the fact that it has become an intimate part of Blackfoot astronomy. Brings-Down-the-Sun, an old Blood ceremonialist, in relating the "Star Husband" tale to McClintock (1910, p. 500) pointed out that the constellation known as the Spider Lodge was thus named because of the arrangement of its stars, suggesting a tipi ring:

> The half circle of stars to the east (Northern Crown) is the lodge of the Spider Man, and the five bright stars just beyond (in the constellation of Hercules) are

---

[4] Claude E. Schaeffer, Portland, Oreg., kindly brought this reference to my attention.

[5] In a letter dated March 25, 1954, John C. Ewers commented on this passage, "The use of stones to hold down tipis in winter could be a survival in historic times from a common (perhaps year-round) custom in the protohistoric. Undoubtably it would be quite a task to drive pegs into frozen ground in the winter season."

his five fingers, with which he spun the web, upon which So-at-sa-ki was let down from the sky. Whenever you see half-buried and overgrown circles, or clusters of stones on the plains, marking the sites of Blackfeet camps in the ancient days, when they used stones to hold down the sides of their lodges, you will know why the half-circle of the stars was called by our fathers, "The lodge of the Spider Man."

In another place (McClintock, 1910, p. 492) Brings-Down-the-Sun, in discussing the origin of the Sun Dance, pointed out:

> We know not when the Sun-dance had its origin. It was long ago, when the Blackfeet used dogs for beasts of burden instead of horses; when they stretched the legs and bodies of their dogs on sticks to make them large, and when they used stones instead of wooden pegs to hold down their lodges.

During the years immediately preceding 1909, Clark Wissler recorded information on the material culture of the Blackfoot Indians. He notes (Wissler, 1910, p. 108):

> During the winter, or even at any time, the cover of the tipi was often held down by stones laid on its edges. Circles of such stones are to be seen in many parts of the Blackfoot country, marking the sites of former camps or burial tipis.

Wissler (1913, p. 430) takes the following from Duvall's notes on the construction of the Ma'toki dance structure made from lodge covers, with rocks to weight down the bottoms:

> The ma'toki dance but once a year when the camp circle is formed. Their ceremony lasts four days. First they make a shelter somewhat like the one used for the sun dance. A tipi pole is set up in the center, with a peculiar cross piece near the top. A number of travois are set in a circle around this pole and joined together by tipi poles tied along the top, making a single railing all the way around. Then other tipi poles are tied to this and to the cross piece on the center pole, forming rafters like in the sun dance shelter. On the sides and over the top are stretched tipi covers. At the bottom they are weighted with stones. Along the sides within blankets are suspended.

It has been noted that another neighbor of the Blackfoot, the Crow Indians to the south, used rocks to weigh down their lodge covers. During visits to the Crow Reservation during the period 1907–16, Lowie (1922, p. 224) obtained the following information concerning the practice:

> Bear-Crane stated that long ago rocks instead of pegs were used to weigh down the bottom of tipi covers; another informant restricts the practice to the winter season.

There are, perhaps, other documentary references to the topic that have escaped my attention, but those cited are numerous enough, it is believed, to indicate that the Blackfoot, Cree, Crow, Dakota, and probably other tribes in the northwestern Plains employed stones or occasionally sod as lodge-cover bottom weights. Our references cover the period from 1833 down to contemporary times, when stones are rarely seen, and the wooden tent peg appears to be ubiquitous.

ETHNOLOGICAL CONSIDERATIONS

BLACKFOOT INFORMANTS

Several elderly Blackfoot Indians were questioned about tipi rings and taken into the field to locate and identify them. All of the informants were certain that they were used by their ancestors as weights to hold down lodge covers.[6] Each gave independent testimony that the rings were used in this way and additional information when asked what he knew about the practice.

My ethnographic notes on tipi rings were collected during the summer of 1953 from both Northern and Southern Piegan. Two aged North Blackfoot living near Gleichen, Alberta, interviewed during the fall of 1956, revealed that their tribe had similar customs.

Most of the data came from Southern Piegan located in and about Browning, Mont. These informants were Annie Calf Looking (age 51), Chewing Black Bones (age 87), Jim White Calf (age 89), Cecile Black Boy (age 67), and Adam White Man (age 81). One informant, Bull Head (age 84), from Brockett, Alberta, provided information on North Piegan practices. My interpreters for these Indians were Calvin Boy, Louis Bear Child, and George Bull Child. The North Blackfoot were Pete Little Light (age 78), from Gleichen, whose remarks were translated by Mrs. Rosie A Young Man, and Mrs. Duck Chief (age 92), of Cluny, Alberta, whose relative, a younger woman, served as interpreter.

Bull Head (a North Piegan from Canada) stated that people of his tribe used the rock rings:

> My father, Dog Head or Bull Head (born about 1820, died about 1900), and my grandmother, Red Painted Feet, told me this. It was my great-grandfather's generation, the people that never had the horse and used the dog for traveling, that used the rock rings. They were the people that just had dogs and had to use buffalo traps for a way of getting food.
>
> Now, both the horse and the dog people used the rocks for tipi weights. The horse people used both wooden pegs and rocks to help weigh down the lodge to protect it from the wind.
>
> The outer rocks were used as weights to hold down the tipi for protection from the wind because the tipis were right in the open. These tipi rings were called *iskiman*, "something to hold down the lodge."
>
> The inner rocks in the center of the large ring were the fire hearth. They were about two feet in diameter and used to protect the fire from spreading on the ground. The center rocks were called *áppskitan*, "confine the fire."

Chewing Black Bones testified that the early Piegan did not have tools to use in sharpening tent pegs. They were able to construct a better-shaped lodge after they obtained tools from white traders and could make tent pegs:

---

[6] Hugh Dempsey secured similar information during the summer of 1955 in Alberta (Dempsey, 1956, p. 177).

> I heard my grandfathers, Carries Braid and Middle Sitter, say that their ancestors, the dog-pony people, did not use pegs for their lodges. The reason was that they did not have the instruments to use in sharpening pegs then. They used rocks to hold down the lodge skin in keeping out the wind. The stone circles were known as a "wind break." When the pony came they switched to using just pegs and only rocks continued to be used in the center for the fireplace.[7] When they learned to use pegs the tipis were put up in fine shape.

Jim White Calf said that wooden tent pegs were a later innovation among the Piegan:

> The first people were very poor and lacked everything. They piled rocks on the outside of the lodge cover because they had no pegs then. They did not have wooden pins to fasten the lodge together—they just tied it. Wooden pins and pegs are a new style. After they had completed piling the rocks on the outside of the lodge, they gathered more for inside in order to build a fireplace. These rocks were not placed all around, but a space was left blank at the rear.[8] I do not know the reason for this. Also, there was a space at the door of the lodge where no rocks were placed.

Cecile Black Boy contributed the following:

> We were near Landslide Butte with Spotted Bear and we saw those rock rings. We asked him about them and he told us that the old-timers of our tribe used them to hold down the lodge cover.

One informant, Annie Calf Looking, was able to associate the use of tipi rings with a particular Piegan band:

> My grandmother, Elk Yells in the Water Bear Chief (90 years old at her death in 1946), told me this: the Blackfoot never used pegs to hold down the lodge in the old days. They used rocks and that is why you see the rocks on the prairies today. My grandmother said that her people, the Don't Laugh band, used the rock rings.

Adam White Man, describing the method of tying the skin lodge cover to pegs, also told of anchoring the lodge to the ground against the wind by the use of logs as weights:

> The old-timers always talk about the first people. The people that used the rocks were the ones that used the dogs. The only way of packing their things in those days was by dogs and their backs. The rings are all over, so all the tribes must have used them.
>
> The rock circles found today on the Reservation were caused by people using rocks to hold down their lodge covers. Ever since the Blackfoot got the horse they pegged their tipis. When they began to use pegs they even used to tie a

---

[7] Ewers, in his letter of March 25, 1954, expands this information by suggesting that the true cause of the shift from rocks to wooden pegs was not the horse, but the metal ax, which was an early fur trade importation and thus was first used at about the same time that the horse was obtained by the Blackfoot.

[8] A view of the interior of Mad Wolf's lodge, photographed by McClintock (1910, p. 30) sometime after 1896, shows a boulder-lined fireplace with rocks missing from one side, supporting Jim White Calf's testimony. At the 1956 Blackfoot encampment, Cecile White Man (lodge 23) used 12 rocks placed in a U, with the gap to the west, for her fireplace. A boulder-lined fireplace similar to these, with rocks missing in the west portion, was also excavated on the Reservation (see pl. 48, *a*).

stone in a skin. The stone and the skin were then tied to the peg. They pegged their tipi but still continued to use rocks as weights. The wind was sometimes so strong that our people even put a pole or logs between the pegs and the tent to hold down the lodge.

At this point the interpreter, George Bull Child, interrupted to say that he himself had even seen rocks employed to hold down lodge covers:

> I myself have seen rocks being used to hold down lodge covers. Adam can take you down on Badger Creek where his father put up his tipi and you can see his tipi ring. Old Man Running Crane had a tipi ring and it is still there. It still shows there like the others of the old stone-age people. Their rings are there, too.

Adam took me to his allotment on the north side of Badger Creek to show me his father's (White Man or Eagle Calf) tipi ring (site 24GL422, fig. 29). The circle of boulders was situated on a low terrace, about 100 yards from Adam's ranch buildings and an equal distance from the edge of the terrace bank. The ring was 16 feet in diameter and made up of stream- or glacial-rounded boulders ranging in size from 3 inches to 1 foot. One-third of the rocks were deeply embedded in the grass roots and humus. When I photographed the ring, Adam stood in what he called the doorway, a space 2½ feet wide located toward the east (see pl. 48, *b*). He also pointed out two

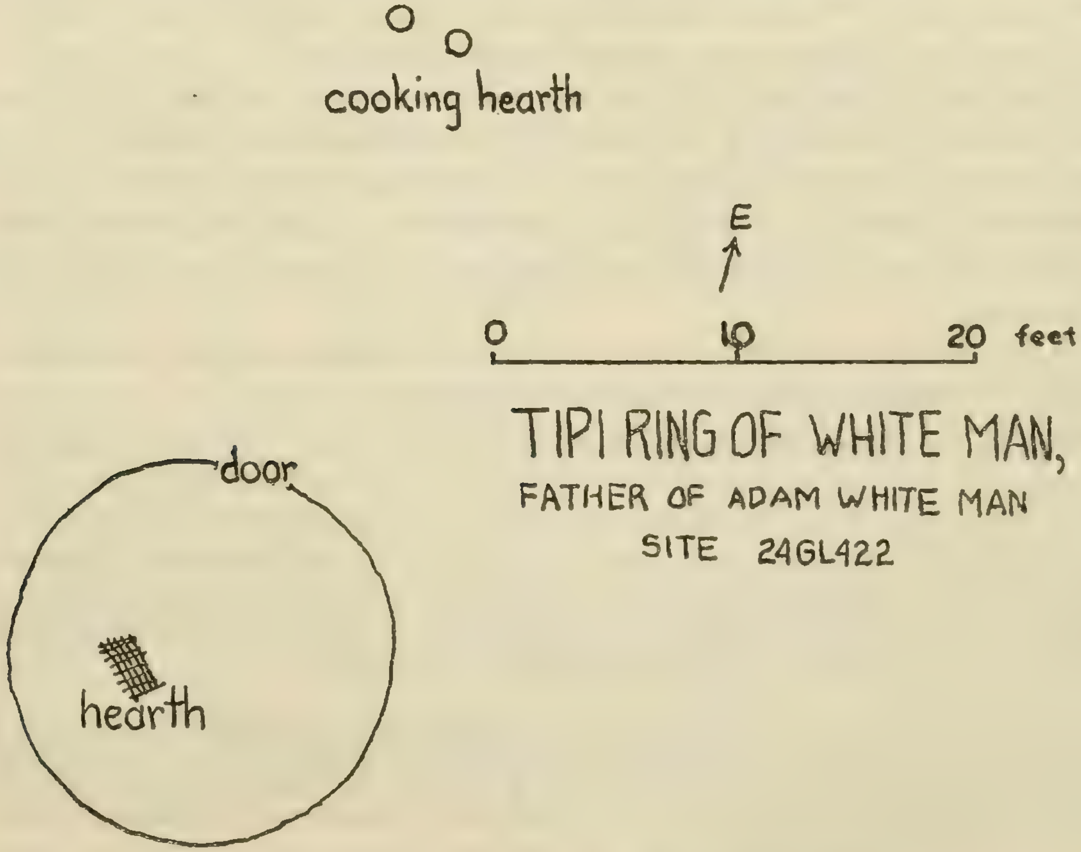


Figure 29.—Site 24GL422 (tipi ring of White Man).

cooking hearths. One was in the center of the tipi ring, but nearer to the west than to the east side. It was not lined with rocks and was visible only by a slight discoloration of the soil. It would have gone unnoticed if not identified to me. The other fire hearth was located 21 feet east of the tipi ring, and consisted of two large rocks about 2 feet apart. Adam said that his father's family cooked inside the lodge only during bad weather, using the outside fireplace most of the year. This, he said, was the reason for the absence of a rock-lined hearth or charcoal remains inside the tipi ring. According to Adam, this tipi ring was then 41 years old.

Next, Adam White Man located the tipi ring of Running Crane, chief of the Lone Eater band (site 24GL427). This was a circle of stones 20 feet in diameter located on a very low, wide stream terrace on the south side of Badger Creek. Adam said that Running Crane's lodge had been pitched here 60 to 75 years ago.

Later, Adam took me to the site of a Sun Dance performance held in his youth. About 1891, when Adam was 19 years old, the Canadian Cree and the Piegan gave a joint Sun Dance. There were two Piegan sacred women, Berry Woman and Hit on Top Woman, each with her own lodge. Adam said, "At the time of this Sun Dance, only the sacred women used the rocks to hold down their lodge covers in the old-fashioned way. The rest of the people used pegs." The tipi rings of these lodges are still visible one-half mile west of Highway 89, on the north side of Badger Creek.

The same informant pointed out several other tipi ring sites that he had first seen during his youth, but was unable to associate them with any particular individual. He believed that they were much too old for such identification. The stones of these rings were more deeply embedded in the ground than were the ones identified by the informant.

Bull Head was able to locate his father's tipi ring on the North Piegan Reserve because he still protected it:

> One of my father's tipi rings is still west of my place. It is like a keepsake to me and I am protecting it from cattle and whatever else might destroy it. There are other rings belonging to my father, but I am just protecting one. I remember that an uncle had a ring there, too. The cattle scattered them and there are very faint traces of them, so I cannot give you the exact number of rings. If you come to Canada, I will take you to the spot and show you the ring that I am protecting and that belonged to my father.[9]

---

[9] Although I was not able to visit this ring, I did see, guided by Charlie Strikes With Gun, a North Piegan from Brockett, Alberta, the tipi ring which, according to a plaque, marks the site of Chief Crowfoot's last lodge, April 1890. This ring is located a quarter of a mile east of the Blackfoot Crossing Monument near Cluny, Alberta, and is protected by a cement and pipe railing constructed around it. The ring is approximately 20 feet in diameter.

Several of the Indians were able to give information on the general location of Blackfoot camp sites during the time when tipi rings were used. Bull Head located the camps in the open, near water, and some little distance from buffalo drive sites when the people were using the drives:

> The camp was located some distance from buffalo traps so the buffalo would not be disturbed. It was usually in a place where they could get water and in the open. More of these rings are found in the open.

Chewing Black Bones said, "They had to camp on hills and did not move very far—just from buffalo jump to buffalo jump." Annie Calf Looking also stated that her people camped in high places for safety and in order to observe the enemy:

> The word for camp is *mἁmapis*. In the summer they camped on the hills or in high places so that they could look for the enemy.

Adam White Man pointed out that the camps were located in higher terrain along the streams during the late spring because of the danger of flooding:

> When you see these tipi rings along the creeks and in the valley bottoms, they are the winter camps. In the spring when it floods they move up on the benches and high ground.

The interpreter, George Bull Child, interrupted here to say that there were different places to camp during certain seasons:

> I heard the old people of our tribe say that our people camped in the brush of the sheltered valleys near the buffalo drives in the winter. The winter camps were in the brush and the summer camps on the flats above the streams.

The Indians were questioned concerning the size and plan of the camp, as well as about a camp circle. They all agreed that their people used a camp circle, but usually split up into smaller hunting groups in the fall. Bull Head said:

> Yes, I heard that they used the camp circle but they usually did not travel in large groups. They were in search of food and that is why you find these places with rock rings—sometimes one, only two, and then sometimes five in one spot. They were small groups of people in search of food.

Annie Calf Looking said:

> My grandmother told me that her people planned to meet together in the summer and had a large camp circle. In the winter there was no larger camp circle, but each band did have a small circle in the winter camp. The band broke up in the winter time after they got their meat. She also told me that her people camped more in groups after they got the horse. The chief would have his ring in the center of the camp circle. He would be the one with the most wives and would have the big tipi ring.
>
> My husband, Paul, tells me that he saw a single tipi ring recently out on Birch Creek. It must have been a jealous man who camped out alone like that. He did not know why it was single in the old Skunk People's (his band) camp.

The informants were questioned as to the size of the tipis when their ancestors used the tipi rings. They all agreed on the fact that the tipis were not large before their people acquired the horse. Several of them said that they heard of large tipis or tipi rings with two fireplaces during "horse days"; this tipi had to be taken apart when moving. George Bull Child, the interpreter, had interesting information on the size of the precontact lodge:

> The tipis were not very large before my people got the horse. The dogs were bigger then, but they could not carry very much even though the travois made a load lighter. A certain dog would have to carry a tipi skin alone. The lodge poles would be smaller in those days, so that a dog could pull them. A big cover would be only ten skins then. Some fellows would say, "My tipi is six skins." A big chief would have ten skins. Later on, when they got the horse, eighteen to twenty skins was average. [10]

Adam White Man said that small tipi rings occurring in a camp of larger rings may have resulted from the smaller dwellings of widows, elderly people, and from children's play tipis.[11]

All the informants were asked whether or not their people ever returned to the same campground and occupied the same tipi ring. Several of them thought that it was not the usual practice for their people to return to the same ring. Bull Head agreed with this but added, "It was not the usual practice for people to come back to the same ring, but my father did return to the one I am protecting. There is no reason to believe that my father considered he owned the tipi ring that he returned to." Information contrary to this was given by Annie Calf Looking:

> Yes, my grandmother said that her people, the Don't Laugh band, would leave their rock ring and mark it.[12] No, she did not tell me where they camped but she did tell me that they marked their camp. They marked their own stone ring and they could not take another person's ring. If you wanted someone's ring, you would have to pay dearly for the spot.[13] You would have to give robes, dogs or horses if you came and wanted to take someone's ring away. There was quite a dispute when someone came and took another person's camping ground. Each person would know right where their ring was located. When a person died, their brother could take the ring, give it to someone else, or leave it blank. People kept from taking a person's ring because they were afraid of the dead.

---

[10] In his letter of March 25, 1954, Ewers believes "the estimate given by this informant on the *average* size of the Blackfoot lodges in posthorse period to be excessive. My informants (independently) seemed to agree very well with Wissler that the average sized tipi was twelve to fourteen skins." (Italics mine.)

[11] A photograph confirming Adam White Man's statement was published by McClintock (1936, p. 10), in which two children are shown playing in a small tipi, the sides of which are held down by rocks. A modern example of this play tipi was photographed by the writer at the 1956 Blackfoot encampment (pls. 55, *a*; 56, *b*; 61, *a*).

[12] Cecile Black Boy claimed that the tipi ring was marked by buffalo horn cores left among the rocks of the ring.

[13] Annie Calf Looking may be here confusing ownership of the ring (as a collection of rocks) with ownership of the right to camp in a certain position in the camp circle (see, e. g., Grinnell, 1892, p. 224).

Regarding the practices of the North Blackfoot, Little Light, elderly member of that tribe, told that:

> In the dog days they just used rocks on the edge of the tipi cover, to hold it down. They didn't use pegs because they had no axes. When the white men brought axes they made pegs. In the old days they used hide liners, tied to the lodge covers, and held down with stones.

Mrs. Duck Chief, the oldest resident of the North Blackfoot Reserve, explained why rocks are not used on the modern tipi:

> Where old Indians pitch their tipis, they put the rocks around the tipi to keep it down, so when it's windy the pegs won't come out. They don't do it now-a-days; only old people with hide tipis used them, when the tipis were used often, for every day. The hides stretched more than canvas, so the rocks didn't roll off as they would from tight canvas.

In summary, the statements of all the informants bear out that tipi rings represent just what their name suggests: rings of stones employed by earlier Indian residents to hold down the sides of their skin tents. At least one of the early white observers, as well as several elderly Indians still living on the reservations of Montana and Alberta, actually witnessed these tipi rings in use in a Blackfoot camp. (The Museum of the Plains Indian has in its files a photograph, taken in 1910, showing Tom Horn, a Blackfoot, standing before his tipi, the Otter Lodge, with his wife, Different-Kind-of-a-Gun-Woman, and their children. The bottom of the cover, although pegged, is weighted with rocks, several of which have been made heavier by logs placed over them (pl. 61, *b*)). It was possible to identify a few rings in the field, but most of them were claimed to be too old for such knowledge to be retained by the informants.

Every informant was certain that tipi rings resulted from the use of rocks to hold down skin lodge covers, and that they were needed as weights to prevent the lodge from being overturned by the strong winds, as well as to keep it warm by fixing the cover close to the ground. When found inside a tipi ring, a smaller ring was the result of rocks having been used to confine a fire, but such was not the inevitable practice, for cooking was sometimes done outside during good weather. A third cause of rock rings was the practice of weighting down the inner liner with stones;[14] however, Mrs. Duck Chief remarked that filled parfleches were also employed for this purpose.

The informants testified to the use of tipi rings both during protohistoric times before the acquisition of the horse, and during historic times. All agreed that the protohistoric tipi was small, and that the tipi became exceedingly large after the horse was obtained. They thought that transportation problems had a direct bearing on the size of the lodge, as did the practice of polygyny. Tipis at one time were often so large that two fireplaces were needed inside, and the covers had to be split in two parts upon moving.

---

[14] A tipi liner held down by stones was photographed at the 1956 Blackfoot encampment (pl. 57, *a*).

The Indians had heard that the earlier Blackfoot, when hunting buffalo, located their camps near the jumps but not so close as to disturb the animals. Many times the camps were placed in the open, on high places or hills, yet near water. One informant said that this was customary in order to observe the enemy, while another believed that it was to escape spring floods. In the winter, camps were located in the sheltered valley floors; it was in summer that they would be pitched on the flats above.

The informants all believed that the size and plan of the camp depended upon the annual subsistence cycle and the ceremonial observances during the summer. Small tipi rings in a camp of larger rings were probably the lodges of widows or elderly persons, or children's play tents.

There was a division of opinion among informants on whether or not the earlier members of their tribe returned to the same tipi rings in the process of migration during the annual subsistence cycle.

INFORMANTS OF OTHER TRIBES

In addition to elderly Blackfoot informants, members of other tribes were questioned when they came to Browning on visits or for celebrations.

Dave Frenchman and Edward L. Martell, from the Cree Reserve (Moosemen Reserve), Saskatchewan, 22 miles north of North Battleford, had been told by the old people of their tribe that the stones of tipi rings were used to hold down the edges of lodge covers. Sometimes there would be a large ring in the middle of the camp circle, and this would be the location of the chief's tipi, that is, of the best warrior and the leader of the tribe. These informants had never heard of a hearth in the center of a tipi ring.

Ethel Potter (age 50), an Arapaho from the Wind River Reservation, Wyo., said that her father, Mike Goggles (age 74), had shown her a place where rock rings were located, as they were traveling through the mountains, and had told her that they had been used by the people of his tribe to hold down the skin covers of lodges. She had not heard of these circles of stones in connection with ritualistic practices and knew nothing of "medicine wheels."

(Sister M. Inez Hilger (1952, p. 93), in a study of Arapaho child life and the milieu in which these children lived, discovered that when signs of a hard winter or an approaching storm were noticed, "The old men would tell their wives to weight down the edges of the tipis with plenty of rocks to keep the tipi covers down and thereby the cold out.")[15]

An employee of the Blackfeet Agency Headquarters in Browning, Mont., Stanley Pugh, an Oglala Sioux from the Pine Ridge Reservation in southern South Dakota, repeated what his grandmother, Alice Palliday (now deceased), had told him of the origin of tipi rings:

> My grandmother told me that in winter time they would cut fine willows and straw or marsh grass. They would place it between the pegged skin cover and the ground in order to keep the lodge warm. Rocks were placed on top of the lodge cover in order to keep the willows and straw from blowing away. The rocks used were of a size easily carried by a woman. After the tipi was taken down the rocks were left remaining as tipi rings. I have many times seen tipi rings in that country. Charcoal and scattered cooking stones remained, showing where fire hearths had been in the center of the ring.

(George E. Hyde (Will, 1924, p. 294, footnote 2) speaks of a similar practice of making large bundles of long grass, to pile up around the lodge for warmth in winter, in the traditions of the Cheyenne, who when they moved west into the short-grass country substituted sod for the grass bundles.)

Ambrose Rider (age 47), a Gros Ventre of Fort Belknap, stated that old people of his tribe claimed that tipi rings were made by "Ute" peoples who once roamed that area (there is probably confusion on the part of this Indian between the Ute and the related Shoshoni tribe). He further said that there are a large number of tipi rings in the Fort Belknap area, and that some of them occur on high places. Large, about 20 to 25 feet in diameter, the rings do not appear in camp circles, but are scattered.

ARCHEOLOGICAL CONSIDERATIONS

INTRODUCTION

The area in which the archeological investigations took place was the modern Blackfeet Indian Reservation, located in north-central Montana immediately east of the Rocky Mountains. Its boundaries are formed by, on the north, the forty-ninth parallel (the Canadian border); on the south, Birch Creek (lat. 48°10′); on the east, the Cut Bank meridian (long. 112°10′); and, on the west, Glacier National Park (long. 113°40′). This encompasses an area approximately 50 miles on each side, containing 2,384 square miles, slightly larger than the State of Delaware. Of this, only 230 square miles, or one-tenth, had been broken by the plow at the time of these investigations (1953). However, this figure does not include the irrigation ditches, dams, roads, and other activities, such as the building of rock shrines by sheepherders, that destroy tipi rings. Nevertheless, the proportion of disturbed land is considerably less on the Reservation than on most of the rest of the northern Great Plains, or of the State of Montana.

---

[15] I am indebted to W. S. Campbell of Norman, Okla., for bringing this reference to my attention.

Because this area represents one of the last regions in which many of the aboriginal aspects of the Great Plains may still be observed, being relatively unaffected by farming, and in which many of the older inhabitants retain a first-hand knowledge of native Indian customs, it is a critical area for anthropological study.

ENVIRONMENTAL FACTORS

The environmental setting is of importance in interpreting the archeological sites of the Blackfeet Reservation. It was a major factor determining the manner in which the early inhabitants of the region lived, whether they must be nomadic, and what materials were available to fulfill the needs which their culture stimulated.

The geology of the Reservation (Alden, 1912) is complex, and has given considerable variety to the topography. Much of its character is due to glaciation: the terminal moraine of the Keewatin ice sheet can be seen lying across the eastern portion of the Reservation, and the piedmont glaciers, remnants of which still flow in Glacier National Park, sculptured the western edge. In addition, stream erosion further modified the pre-Pleistocene "Blackfoot Peneplain," the ancient level of which is marked by buttes and ridges rising several hundred feet above the present rolling plain. (The edges of these eminences, dropping steeply and abruptly, were utilized by the Indians for bison drives; beneath many of them the depth of the bison bones testifies to their effectiveness in slaughter.) The rock of these ridges is Cretaceous sandstone and shale.

The mountains of the Lewis Front Range of the Rockies form Glacier National Park. From them issue numerous streams, running north, east, or south from the Hudson Bay and Continental Divides in the Park. These streams are now found both in deep gorges and in broad flat valleys, sometimes with gravel-capped terraces. The surface appears as a treeless plain, gently rolling in the east, and becoming hilly as it approaches the mountains in the west. The stream valleys are abruptly encountered in this plain; only in them and in the foothills on the western margin of the Reservation do trees grow (cottonwoods in the former, aspen and pine in the latter).

As the topography influenced the inhabitants of the Reservation in selecting dwelling sites, so the climate determined to a large degree which topographic settings were chosen for the different seasons. Climate is one of the most important factors to consider in deciding whether or not rocks would be necessary to anchor skin lodge covers.[16]

The area about the Blackfeet Indian Reservation is, as a whole, characterized by fairly warm summers with abundant sunshine, winters that are cold and dry, and considerable windiness throughout the year. Throughout 1952, the average wind velocity at the closest weather station, Great Falls, was 13 miles per hour, with the prevailing direction southwest. Seasonal variations ranged from a low of 10 miles per hour for August to a high of 18.3 miles per hour for January.[17] However, as Smith (1925, p. 413) has pointed out, "Averages do not tell the whole story. Averages rarely happen. The freaks of the season decide man's chances." The greatest wind velocity in 1952 at Great Falls was 66 miles per hour, in July. Over an 8-year period from 1945 to 1952, there were extremes of 65 to 73 miles per hour nearly every year, with a prevailing southwest direction; every month of the year showed a development of extreme winds. On the eastern edge of the Blackfeet Reservation, at Cut Bank, gusts of slightly over 100 miles per hour were recorded more than once.

When the spring floods forced the Indians out of the sheltered stream valleys where they were wintering, the wind on the open uplands would be so strong as to necessitate the use of rocks for tent weights, for with such gusts it would not otherwise be possible to hold down a skin lodge cover.

This mountainous region, then, around the headwaters of the Missouri River on the western margin of the High Plains, was the habitat of comparatively many tribes, offering them plentiful game and, though the winters are severe, providing shelter against the climate in the numerous valleys.

ETHNOLOGICAL BACKGROUND

The history of the region of the Blackfeet Reservation is important in understanding the archeological material found on it, as well as in relating it to historical and ethnographic considerations.

In the area of the Reservation, a number of different tribes representing various linguistic stocks, cultural traditions, and with diverse geographic connections were to be found at different periods. In early and middle prehistoric times, no doubt, nomadic tribes, some subsisting chiefly by hunting and others by both hunting and gathering, occupied the region. Excavations at two sites on the Reservation have produced points and artifacts reminiscent of types found at early Middle Period sites in the Plains: at the Billy Big Spring site, one McKean and several Hanna type points (the former dated by radiocarbon at 3445 ± 120 years before present at Signal Butte) were discovered with geological implications that suggest considerable antiquity (Kehoe, 1955, p. 2).

---

[16] Mae Williamson, a prominent middle-aged Blackfoot (president of the Blackfeet Arts and Crafts Association), reports that in her girlhood she asked the old people of her tribe why the tipi rings are often located in what she would consider a poor camping spot, and that they replied, "You young people are too particular about where you camp. We would camp wherever we had to, many times. We might have had to make camp when we were caught in a blizzard, and that is why you see those tipi rings in places that would not normally be used for camping, if we had a better place."

[17] Data summarized from the U. S. Weather Bureau's tables for Great Falls, Mont., in 1952.

It seems likely that some of these early groups may have been Athapaskan bands, or perhaps affiliated with these. They may, as Gordon Hewes (1948, p. 7) suggests, have lingered on in the region in late prehistoric times. (For the purposes of this paper, the protohistoric is assumed to have begun with the introduction of white trade goods about 1728 (Lewis, 1942, p. 16) and the historic period with Thompson's exploration in 1800 (Ewers, 1944, p. 20)). The close of the prehistoric saw the Shoshoni occupying the territory of the present Reservation, and ranging far north on the Plains into Saskatchewan, where the Blackfoot were encountered in the Eagle Hills; horses obtained from Spanish colonies in New Mexico via the Comanche gave the Shoshoni this mobility soon after 1705 (Ewers, 1955, p. 6).

Close to the Shoshoni, in this period, were the Kiowa and Kiowa-Apache, according to their traditions at the headwaters of the Yellowstone and Missouri Rivers. Mooney considered the Kiowa-Apache an Athapaskan group coming to join the Kiowa from the north, possibly through the region of the Blackfeet Reservation (Hewes, 1948, p. 7).

Before the southward movement of the Blackfoot in the late 18th and early 19th centuries, the Kutenai and two Salishan tribes, the Flathead and the Pend d'Oreille, hunted in the territory of the present Reservation, in conjunction with the powerful Shoshoni, from whom they obtained horses, but it has not been determined whether they ventured from the mountains before they had acquired the horse (Ewers, 1949, p. 356).

About the middle of the 18th century the Blackfoot began migrating south from the Eagle Hills of southern Saskatchewan. By 1800 these mounted warriors, equipped with firearms, had become masters of the vast territory between the North Saskatchewan River and the headwaters of the Missouri, stretching east from the Rockies about 10 degrees of longitude (Swanton, 1952, p. 396). The Piegan, southernmost of the Blackfoot tribes, have thus occupied the area of their Montana reservation for over a century and a half.

ARCHEOLOGICAL FIELDWORK

A preliminary survey of tipi-ring sites was undertaken in October of 1952, after regular excavation projects were completed. At this time, 23 sites were examined before severe weather set in. During the fall of 1953, a further survey was undertaken to examine reported sites and to locate others. In these two seasons a total of 210 tipi-ring sites were discovered within the limits of and in the various portions of the Blackfeet Reservation, comprising well over 1,000 individual tipi rings. Subsequent travel over the Reservation has brought to notice at least 150 additional tipi rings, but they have not been closely examined; this study is confined to the intensive survey of 1952–53.

Since it was not possible to fully test the majority of these sites, this report is preliminary in nature and will include only summary descriptions and brief comparisons of the data collected. Furthermore, the significance of the data in its fullest implications cannot be extracted from the evidence at this time: only by much future archeological fieldwork and extensive comparisons both with sites in other localities and with ethnographic materials can these Reservation sites be defined culturally and chronologically.

Proportion of tipi rings to other sites.—The 210 surveyed tipi-ring sites comprise 72 percent of the total number of archeological sites found on the Blackfeet Reservation through 1953. This figure compares with the 22 tipi-ring sites forming 42 percent of the total number of sites reported by Bliss (1949, p. 10) at the Tiber Reservoir on the Marias River, southeast of Shelby, Mont. Bliss' work at other reservoir sites indicates that six tipi-ring sites, forming 19 percent of the total surveyed, were found at the Canyon Ferry reservoir on the Missouri River near Helena, Mont.; only six tipi-ring sites, or 14 percent, at the Glendo Reservoir in southeastern Wyoming; nine tipi-ring sites (12 percent) at the Boysen Reservoir in Wyoming; and none in the Oregon Basin, 8 miles southeast of Cody, Wyo. (Bliss, 1949, pp. 8–10). These surveys indicate that the region of the Blackfeet Reservation may possibly represent a cultural hearth for tipi-ring sites.

Location of tipi-ring sites.—Tipi rings were found in nearly all parts of the Reservation, although an intensive survey was not made of every locality. The rings occur at elevations of from 3,500 to 5,000 feet above sea level, in both valley bottoms and as much as 600 feet above the valleys on the intervening flat-topped ridges.

Going to the east, the first occurrence of tipi rings is 4 to 6 miles from the front range of mountains, and about 3 to 5 miles from the massive ridges bordering the principal valleys heading in the range. At this point, the rings are placed on the elevated pediments and elongated ridges extending from the mountains, on the abrupt edges of the flat-topped ridges, and in the river bottoms or on the terraces of varying heights. Continuing east, the elevated pediments give way to buttelike eminences; the tipi-ring sites are found along the escarpment edges and on the fingers of these buttes, and on the more gradual marginal slopes (see pl. 49, *a*), as well as, still, on the stream terraces and in the valley bottoms.

All the local topographic settings on the Reservation favorable to camping reveal tipi rings, both large and small. However, the rings occurring on elevated areas seem to average smaller in size than those found in low situations, suggesting a possible correlation between the size of a ring and its topographic setting. Withers (1950, p. 11) notes a similar observance in Colorado:

> We also saw sites of the stone circle type. Following a suggestion I got from Bliss, I think we can probably work out two occupations from the stone circle sites, one with fairly small circles located on the bluffs above the river bottoms, and one represented by the larger circles found consistently on the valley floors.

This difference would be difficult to explain, other than by either supposing a preference for smaller tipis on the higher locations (owing perhaps to the force of the winds there), or by postulating different cultural occupations, as Withers suggests, during one of which, possibly, a climatic change flooded the bottoms (detailed geological studies have not been reported on the paleoclimatology of the Reservation, which, because of its proximity to the glaciers of Glacier National Park, undoubtedly experienced many unique local variations in climate).

Camp plans.—There may also be a relationship between the camp plan and the topographic setting, caused by seasonal subsistence cycles and ceremonial observances. However, although there were different tent arrangements in the larger tipi-ring sites, and several vaguely defined camp patterns were worked out, a definite correlation between plan and setting has not yet been determined.

When three rings were present, they were either in a single row or forming a triangle. In clusters of four or more rings, they were arranged in single lines, double alternating lines, V, semicircle, or circle. But in many cases the group of tipi rings was haphazardly arranged or scattered—either it was impossible for the writer to pick out the camp plan or there had been no intended arrangement in these cases.

Although immediate topographic features, as well as the number of lodges in the group, would to some extent determine tent arrangement, some choice was possible on camp plan. The following table gives the number of sites and of tipi rings for each of the several camping arrangements:

TABLE 1.—*Camp plan or pattern*

Plan	Number of sites	Number of rings
A. Single isolated ring	63	63
B. Two rings	24	48
C. Three-ring triangle	5	15
D. Single row	16	110
E. Double alternating row	3	199
F. V arrangement	1	31
G. Semicircle	4	38
H. Circle	5	112
I. Haphazard or scattered	16	134
Total	137	750

In most of the 137 tipi-ring sites closely examined on the Reservation, the rings were single isolated rings, in small groups of two or three, or in clusters of from 4 to 55 rings. One site, however, contained 170 individual tipi rings placed in a double alternating line extending for 4½ miles along an escarpment. The rings were usually 5 to 50 feet apart and the same distance from the abrupt edge of the flat ridge. Since they overlooked Trail Coulee, they may possibly have been connected with the Old Whoop-up Trail.

All these arrangements except the triangle (C) occur in all the different local topographic settings on the Reservation. The sites containing only three rings are found on flat-topped ridges, including their edges, in saddles between hills, and on escarpment fingers.

Those occurring as isolated single tipi rings ranged from 12 to 24 feet in diameter and averaged 17.3 feet. At the sites containing two rings only, the tipi rings were between 7.5 and 25 feet in diameter, averaging 15.9 feet. Three rings in one site varied from 10 to 27 feet in diameter, and also averaged 15.9 feet; a total of 12 sites contained only three rings. In the 38 sites in which the tipi rings are found in clusters of from 4 to 170, the rings ranged in size from 10 to 29 feet in diameter. The complete range of diameters of tipi rings on the Blackfeet Reservation is thus between 7.5 and 29 feet, and the average for a sample of 108 sites was 15.8 feet. It can be seen that the size of the tipi rings, though somewhat variable, is circumscribed within narrow limits; and both the range and the average correlate very well with the sizes of conical lodges used as dwellings by the tribes of historic times.

Shape of tipi rings.—No eccentric forms of tipi rings were found—just circles such as would result from rocks used to hold down lodge covers. No tipi rings found suggested a ceremonial use. Neither partial nor overlapping rings were observed, indicating that the people may have returned to the same rings, or at least would not disturb an older ring to use the rocks in erecting a new lodge.

The late H. P. Lewis, in an unpublished manuscript on buffalo kills in Montana, briefly discussed the tipi rings he discovered in north-central Montana, and came to the same conclusion, that even though rocks may have been scarce, the rings were not re-used for another tipi. He states, "Strangely enough I cannot remember ever seeing such rings appearing as though they had been disturbed, or worked over, or any part of the circle lacking" (Lewis, MS., chap. X, p. 27).

Depth of rocks.—There seems to be a correlation between the size of a ring and the depth to which the stones are embedded in the ground. Depth below surface was recorded in 65 sites containing a total of 391 tipi rings, and in this large sample the size of the tipi rings seems to diminish in proportion to the depth to which the stones are embedded. However, in comparing individual sites or rings, the depth of the embedded rocks would be a poor criterion for chronological classification or dating, for conditions such as erosion, deposition, frost action, and cultural variations in lodge sizes, reflecting occupants' status or similar factors, would affect each site differently. Table 2 summarizes the data on sites and depth:

TABLE 2.—*Rock depth and tipi-ring size*

Proportion below surface	Average size (feet)	Number of sites	Number of rings
One-quarter	18.3	4	58
One-half	17.2	22	100
Three-quarters	16.7	32	165
Nearly below	14.6	7	68
Total		65	391

A further relationship can be noted from table 2, between the number of tipi-ring sites and the depth of the embedded rocks. Eighty-three percent of the sites in the sample had rocks one-half to three-quarters embedded in the ground; comparison with the number of sites in which rocks are nearly below the surface is invalid, because of the difficulty of discovering these sites, but the presumably more recent sites, with rocks near the surface, are readily observable. There thus appears to be an increase in the number of sites and of tipi rings with an increase in the depth of the rocks of the rings below the surface. It may be supposed that the rings in which the rocks largely uncovered by sod are found postdate the period in which the Blackfoot lived exclusively in tipis, and they may therefore have been built only for the annual summer ceremonies.

Door gaps.—Very few of the tipi rings have an area in which rocks are absent, presumably the gap left at the lodge door, where rocks were not needed to hold down the cover. In only 11 of the 85 sites closely investigated in this regard did door gaps, ranging from 2.5 to 8 feet across and averaging 4.8 feet, occur.[18] A total of 14 individual tipi rings had door gaps. The rings with door gaps varied from 13 to 19 feet in diameter and averaged 15.8 feet. In all cases except two, the door gap faced approximately east; in one it faced northeast and in the other, south. One site of six rings 12 to 13 feet in diameter contained in it three rings with door gaps, all facing east.

---

[18] Many lodges did not have a door extending to the ground, but only a narrow hole about 1 foot above it. The cover would have to be held down under this opening, but, since there was usually no interior lining at this point to be also secured, there would be fewer rocks in the ring here. However, Mae Williamson (see footnote 16) stated that she was told that in cold weather the gap at the door might be lined with a robe, or a second hide door might be constructed, or the door itself might be pulled down and inside under the tipi edge, all of these contrivances necessitating rocks as weights; at the least, parfleches could be placed against the unlined, drafty door bottom, and even these might require rock weights. Allowing for these practices, the absence of a door gap so often noted in tipi rings is not surprising.

Quantity of rocks.—Although there was variation in the quantity of rock material used in tipi rings, it always seemed in proportion to that needed in weighting down a lodge cover. Thus, when smaller rocks had been employed, a greater number appears to have been used, as would have been required.

In many cases, clusters of tipi rings of large diameter seem to contain fewer rocks. It may be that pegs were used to supplement rocks (see pl. 61, *b*) during the period when these larger rings were used.

Rock type.—The unique array of rock exposures and glacial drift gave to the Indians of the Blackfeet Reservation area a wealth of raw materials for lodge-cover weights. In the great majority of the sites (206), glacial drift or stream boulders make up the rock rings. This material ranges in size from cobbles 3 inches in diameter to boulders 1½ feet long and about 6 inches to 1 foot in diameter. The stones may be partially rounded, but are mostly subangular, with some faceted and striated. The preponderance of mostly subangular rocks can be explained partly by the natural profusion of these rocks and partly by a preference for rocks that would not roll. The material seems to be wholly derived from the mountains and heterogeneously mixed; it was principally quartzite (white, yellowish, banded pink, and red), with pebbles of maroon argillite and of diorite. In most cases it was not necessary for the rocks to be carried more than a few feet; they could be carried by women.

Four sites had rings composed of sandstone and conglomerate slabs from nearby outcrops. The tipi rings were 15 to 18 feet in diameter, but the slabs were much larger than the usual rocks—from 10 inches to 1½ feet in diameter. However, the only difference between these rings and the more common ones of boulders was that, because of the larger size and more angular shape of the slabs, fewer were needed. These four sites were located on the edge and the marginal slopes of flat-topped ridges, close to the Cretaceous rock exposures.

These rock types represent the use of available materials, as in the unglaciated prairies to the east, where turf or sod was used to hold down the lodge covers (Bushnell, 1922, p. 28, quoting Maximilian; Will, 1924, p. 293).

Rock concentrations in center.—Only 23 of the 144 sites on the Reservation closely examined for this feature revealed definite clusters of stones in the center of the rock rings. These are presumed to be former fire hearths. No site was noted in which all the rings in the site had definite center rock clusters. Usually there were one or two such rock clusters in a site of from 3 to 50 tipi rings.

These clusters of stones were between 1 to 4 feet in diameter. Many times they were haphazardly arranged, sometimes appearing to result from putting the fire out by throwing stones on it. These hearthstones occasionally are discolored by fire, but are seldom fragmented, suggesting rather temporary use. Most commonly, these rocks are smaller than those of the outside ring, and therefore it is possible that, in a deeply embedded ring, they are nearly or entirely below the ground surface. When only a few of the tips of the rocks are visible above the surface, they have the appearance of stones naturally scattered on the ground, though in a good many cases, they very probably had had some connection with a fire hearth.

Outside fire hearths.—In five sites, outside fire hearth remains were noted. Adam White Man has stated that his people would cook inside the tipi only during bad weather, and pointed out the outside fireplace belonging to his father's tipi ring (see p. 432).[19]

Inside fire hearths.—Six tipi rings, in six different sites, had definite rock-ring fire hearths. These hearths contained six to eight rocks each. Since so few fire hearths occur, it seems probable that cooking was done outside in many cases, as suggested in the paragraph above. A report on the excavated hearths follows.

Excavations.—Because of the nature of tipi-ring sites, which must be on or very near the surface to be visible, and because both archeologists and reputable collectors[20] have reported that occupational remains are rarely found in excavations of rings, it was decided that excavation would be a relatively minor aid in the solution of the problem of the origin and use of tipi rings, and therefore this activity was not expanded beyond the complete excavation of one ring and the testing of several others.

---

[19] At the 1956 Blackfoot encampment, the occupants of Lodge 1 constructed a hearth 6 feet southeast of their tipi, on which tin cans, bottles, etc. give evidence of cooking. The placement of this outside hearth concurs with a description of such cooking hearths obtained by Mae Williamson (see footnote 16), during her girlhood from older Blackfoot. McClintock (1910, pp. 226–227) also mentions and pictures an outside cooking hearth.

[20] Mr. Carle Leavitt, Conrad, Mont., an amateur collector who is both a serious student and a conscientious observer, excavated a tipi ring several years ago. The ring was located on Leavitt's own property, 20 miles northeast of Conrad, and was about 12 feet in diameter. A fire hearth in the center gave evidence of burning and was surrounded by bone fragments. Although the entire ring was excavated to the original ground level 2.5 inches below the surface, most of the interior of the ring was found to be empty. However, besides the material in the center, the area 1.5 to 2 feet inside the rock circle contained numerous bone fragments and one arrowpoint, with three (side- and basal-) notches, which in Leavitt's experience is unique in this region, except for one other found in a bison kill west of Kevin, Mont. Leavitt recalls that "the point was neither obsidian nor agate—some kind of flint."

S. Victor Day, of Sunburst, Mont., another reputable collector, reports having found worked flakes of petrified wood and moss agate in tipi rings: "I'll show you dozens of places at the tipi rings on my place where they dropped their rejected pieces." In addition, he discovered a full-grooved stone maul "leaning against the inside edge of a rock ring," and several arrowpoints both inside and just outside rings.

The Museum of the Plains Indian has in its collection two stone mauls, both full-grooved, found associated with tipi rings: M. P. I. Nos. 63L and 917L. The first is a stream-rounded boulder 15.1 × 11.7 × 6.8 cm., with a pecked groove 2 to 2.5 cm. wide encircling the center. One end shows considerable use. This maul was found by Richard Sanderville, a leading Blackfoot often relied upon as an interpreter, on Two Medicine Creek "near old tipi rings." No. 917L is a pecked maul triangular in cross section, 15.1 × 8.2 × 8.2 cm., with a pecked groove 2 to 2.5 cm. wide extending around it 4 cm. from the base, which shows evidence of considerable use and tapers to a rounded point also exhibiting the marks of use. This maul was found by L. F. Tenney of Kevin, Mont., on the Milk River Ridge 10 miles west of Warner, Alberta; it was associated with tipi rings and possibly with a bison drive site, and there was a good spring nearby.

It is pertinent to the problem of tipi rings that the nomadic peoples presumably using them possessed very few imperishable material belongings, occupied camps for only short periods, and, since they carried always little more than the bare essentials for living, were able to abandon very little in moving. Ewers (1955, pp. 130–131) states, "Experience made the Blackfoot efficient in packing their belongings quickly in the morning camp was to move. . . . Each family was responsible for its own belongings. Every article had its assigned place and means of transportation." These factors make it improbable that the excavation of tipi rings will reveal much of value in solving the problem of the rings.

Site 24GL390.—This site consists of three tipi rings, averaging 17.3 feet in diameter, situated on a long, flat escarpment finger parallel to and above the north bank of Greasewood Creek. About one-fourth of a mile southeast of Sharps Lake, it is nearly centrally located on the Reservation. The area of occupation is 700 feet, east to west.

Ring 1 (refer to fig. 30) measures 15 feet north-south and 17 feet east-west. The circle of rocks is 1 foot wide with its scattered rocks 6 to 8 inches in diameter. Three-quarters of each rock is embedded in the ground, leaving approximately 2 inches protruding above the surface. There seem to be more rocks on the north side of the ring, and they are more distinct. Since the ring is located on a very slight slope. there may have been more deposition on the south side, covering that part of the ring to a greater extent. One rock is embedded in the interior of the ring 6 feet from the west side. The pattern of a 5-foot section of the ring is seen in figure 30.

Ring 2 is 16 feet in diameter. As in Ring 1, the circle of rocks is 1 foot wide and the stones range from 6 to 8 inches in diameter, being three-quarters embedded in the ground, with about 2 inches protruding. On the east side of this ring a gap of 8 feet in which no rocks occur is present; presumably this marks the doorway to the lodge.

In ring 2, slightly off center (6 feet from the east side, 8 feet from the west, and midway between the north and south sides of the ring), could be seen a rock-ring fire hearth. The hearth was 2 feet in diameter, and its rocks range from 3 to 6 inches in diameter, considerably smaller than those of the tipi ring proper. Excavation of this rock-ring hearth disclosed only five small charcoal particles the size of a pinhead. These fragments were embedded near the base of the rocks, and probably were the last remnants of the charcoal which had been almost all blown out. A gap to the west of the fire ring gave it a U

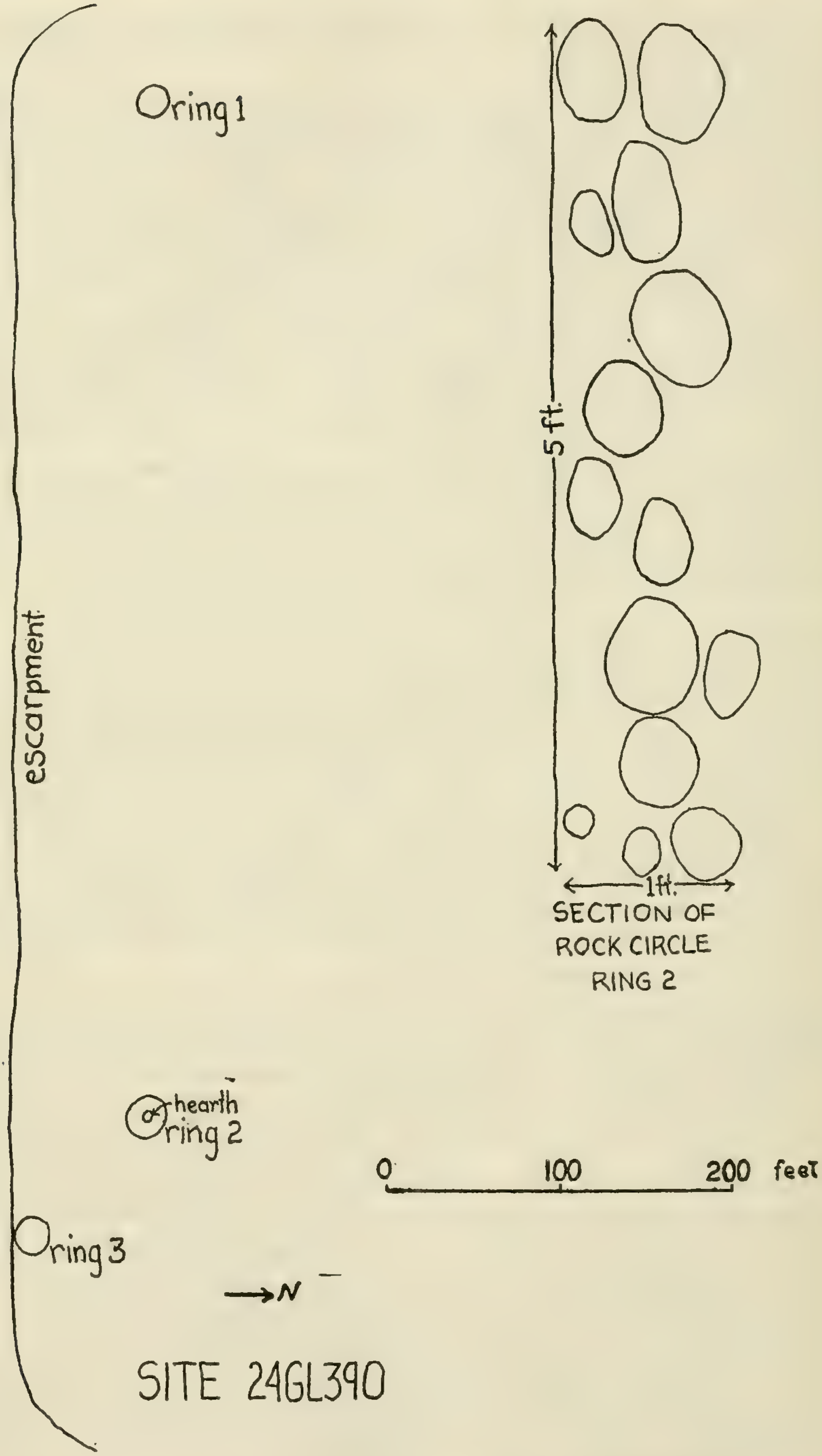

ring 1
escarpment
5 ft.
1 ft.
SECTION OF ROCK CIRCLE RING 2
hearth
ring 2
0
100
200
feet
ring 3
N
SITE 24GL390

Figure 30.—Site 24GL390.

shape. On this point, it can be noted that this occurrence tallies with information given by Jim White Calf, an elderly Blackfoot, previous to the excavation:

> After they completed placing the rocks on the outside to hold down the lodge cover, they gathered more for the inside to build the fireplace. These rocks are not placed all around, but a space is left blank at the rear or toward the back of the lodge. I do not know the reason for this.

It will be remembered that the "back of the lodge" was to the west, since the door always faces east.

Ring 3 is 19.4 feet north-south and 21 feet east-west. The circle of rock is spread over an area 1 to 1.5 feet wide, but the individual rocks still range from 6 to 8 inches in diameter and again are embedded approximately three-quarters deep with 2 inches above the ground surface. These rocks, like those of the first two rings, are glacial boulders of pink quartzite and sandstone. The greatest concentration of rocks is on the northeast side of the ring, but since it is on a slight slope, greater deposition on the southwest side may have led to this impression. There are no rocks inside the ring, and no evidence of a fire.

Site 24GL490.—Two tipi rings, one 11 feet in diameter and the other 17 feet, comprise this site on the edge of the escarpment forming the south side of Milk River Ridge, in the northwest portion of the Reservation. A fire hearth (pl. 49, *b*) occurs in the smaller ring, and was briefly tested, yielding a handful of charcoal, unworked fragments of both burnt and unburnt bone, and four unworked obsidian flakes, 1.2 cm., 1 cm., 0.7 cm., and 0.5 cm. (Obsidian is not known to occur naturally on the Reservation.)

Site 24GL584.—On the north shore of Spring Lake (the middle Mission Lake), in the eastern half of the Reservation, is an area seven-tenths of a mile long and 50 to 100 yards wide, containing approximately 100 tipi rings. These overlook the lake. At the writer's suggestion, Phyllis Jay, then assistant curator at the Museum of the Plains Indian, and her husband, Edward Jay, a trained archeologist, measured several of the tipi rings and excavated one hearth, which is diagrammed in figure 31. Five of the tipi rings were, respectively, 16, 16.7, 16.7, 18, and 19 feet in diameter.

The fireplace of ring 5 was excavated. In it charcoal was discovered at approximately 3 inches below the surface. Although no artifacts were found, the structure of the fireplace was very distinct: it was composed of nine rocks arranged in a U shape roughly in the center of the tipi ring. The nearest neighboring ring was about 15 feet to the west.

Site 24GL486.—The south slope of Milk River Ridge, in the northwest portion of the Reservation, is dissected by intermittent streams,

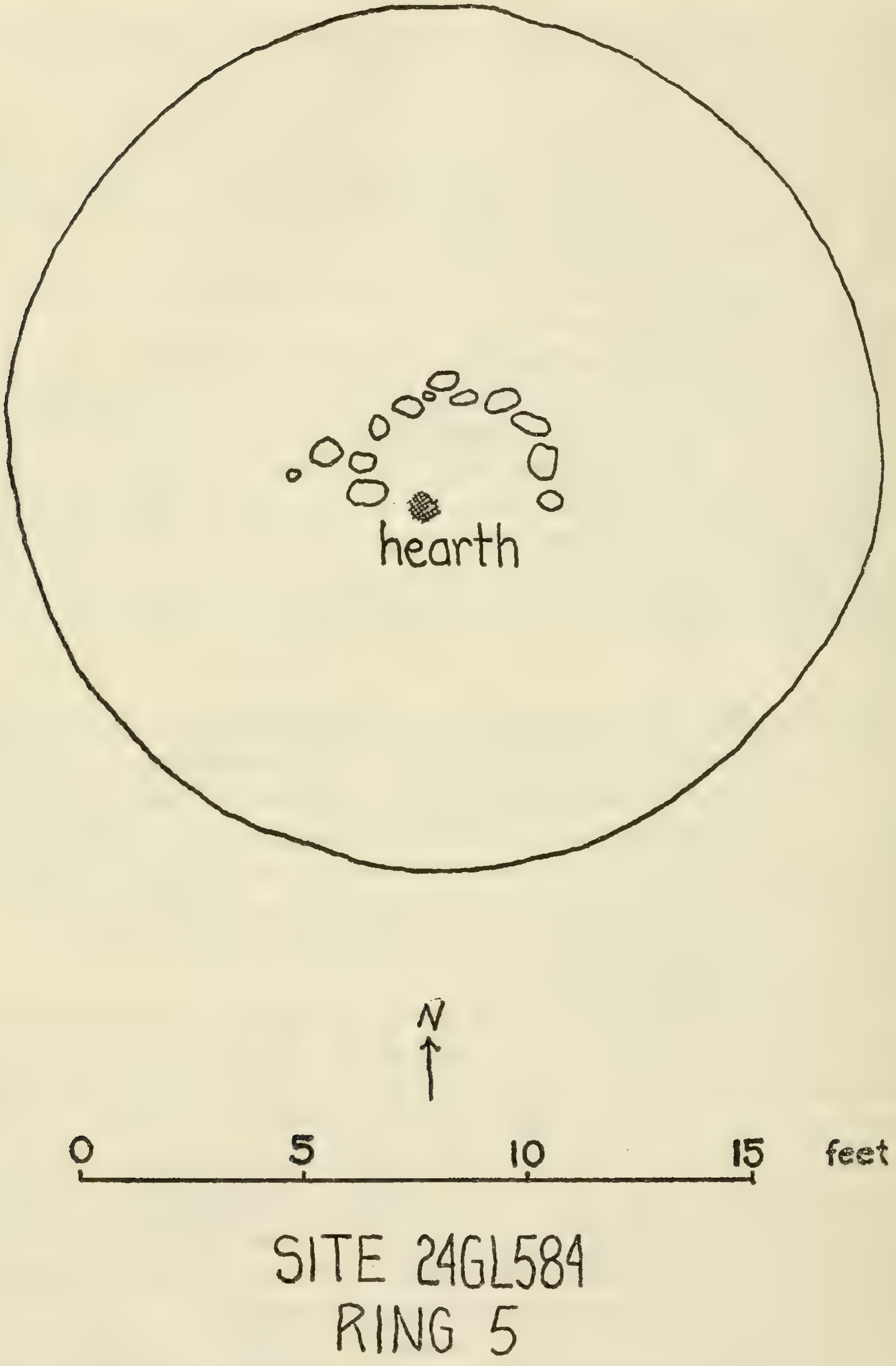

hearth
N
0
5
10
15
feet
SITE 24GL584
RING 5

Figure 31.—Site 24GL584, ring 5.

leaving smaller ridges or fingers extending at right angles to the Ridge (pl. 50, *a*). These flats are excellent camping spots, affording good drainage, observation of the country, and proximity, during certain seasons, to running water. One portion of the Ridge contains 12 sites in an area 2 miles long, encompassing this dissected slope (see pls. 50, *b*, 51, *a*; refer also to fig. 32).

On one of these flat fingers, eight-tenths of a mile southeast of the Milk River Ridge, 400 feet lower than it and 250 feet above the valley

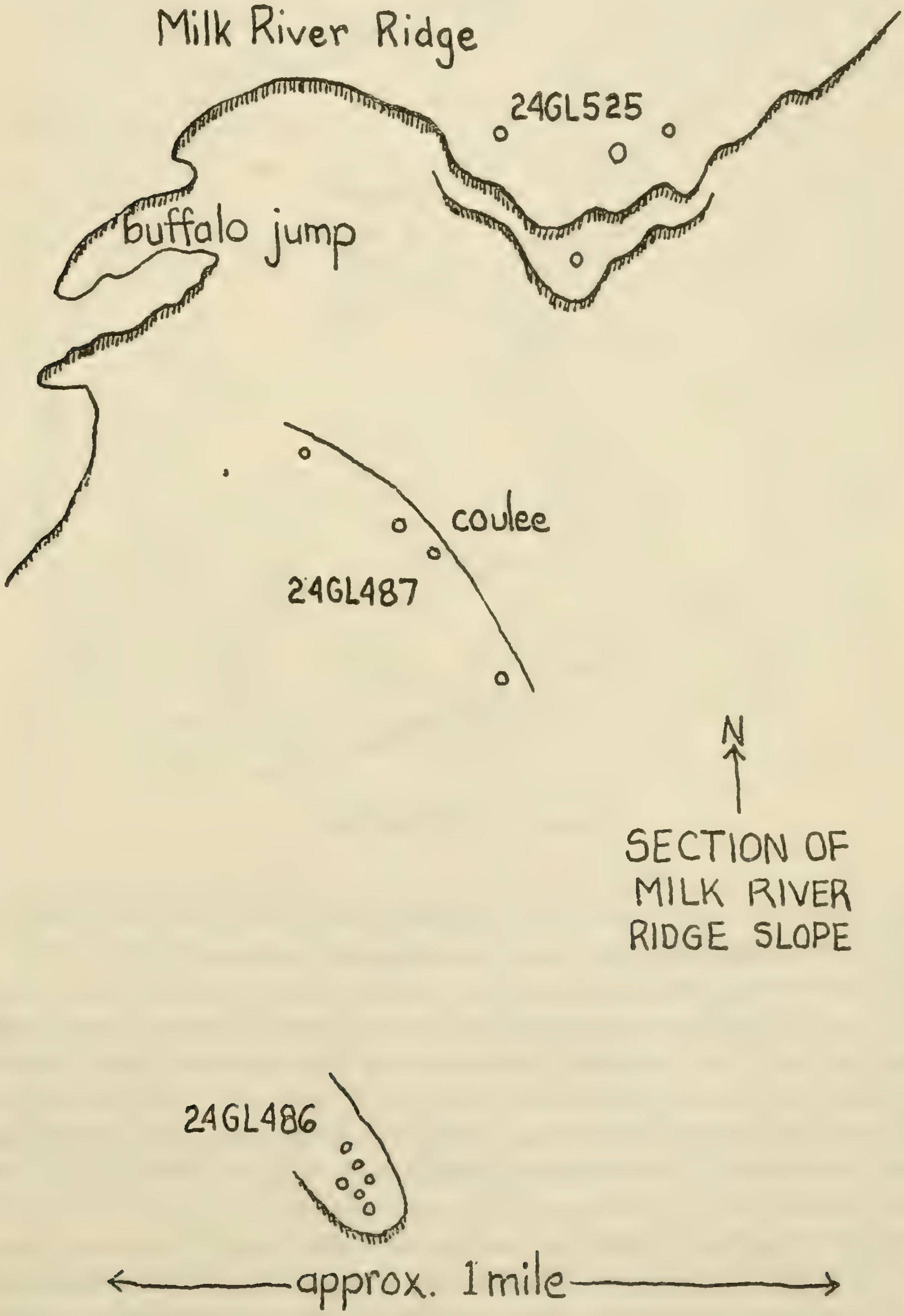

Milk River Ridge
24GL525
buffalo jump
coulee
24GL487
N
SECTION OF MILK RIVER RIDGE SLOPE
24GL486
approx. 1 mile

FIGURE 32.—Section of Milk River Ridge slope with three tipi-ring sites.

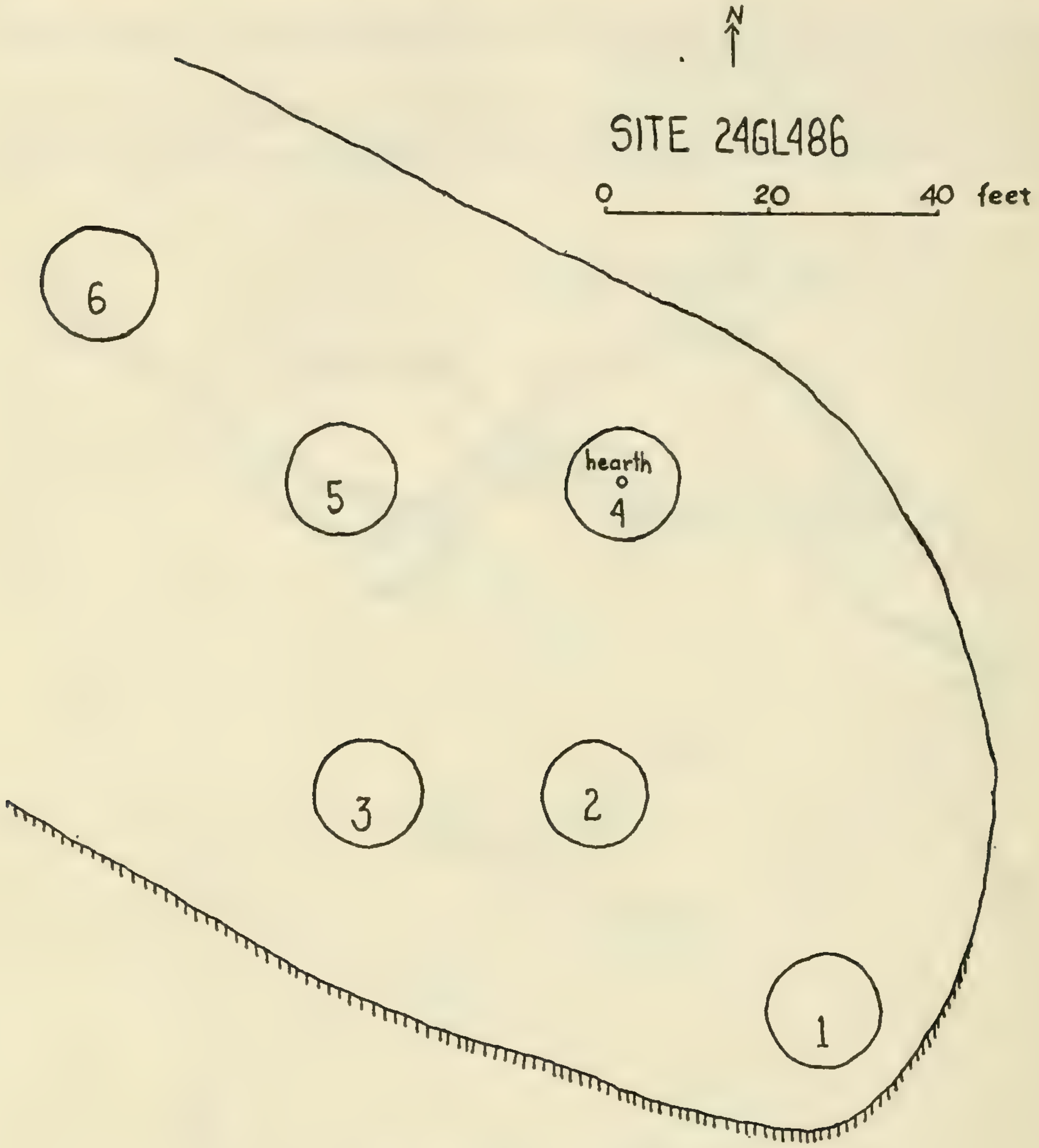
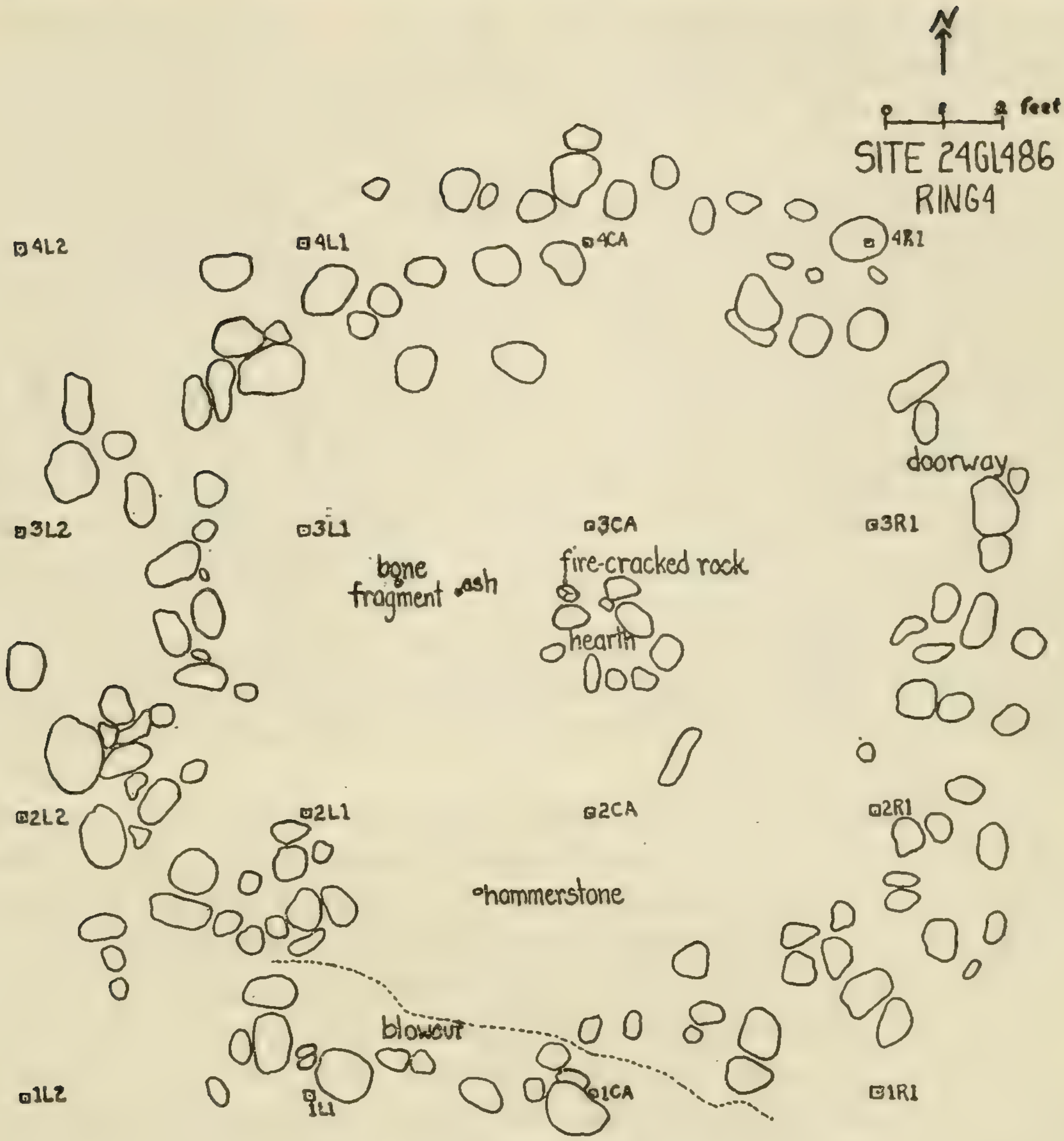


FIGURE 33.—Site 24GL486.

floor, is site 24GL486, which consists of six tipi rings ranging from 13 to 14 feet in diameter, and placed as pictured in figure 33.

In 1953, when this site was first visited, several of the rings were whitewashed and photographed from the Ridge. Except for the displacement of a few rocks on the south sides of a couple of rings, undermined by soil having been blown out, the rings are in good condition. (The wind is exceedingly strong at this site during some months of the year; excavation in October and early November of 1956 had to be discontinued at times because of the powerful gusts.)

A large number of rocks make up each tipi ring; they range from 0.3 to 1.3 feet in diameter, but most are of considerable size and weight. They must have been gathered from the hill crest, where these red glacial boulders are thickly scattered—the only bare spots


N
0 1 2 feet
SITE 24GL486
RING4
4L2
4L1
4CA
4R1
doorway
3L2
3L1
3CA
3R1
bone fragment
ash
fire-cracked rock
hearth
2L2
2L1
2CA
2R1
hammerstone
blowout
1L2
1L1
1CA
1R1

Site 34.—Site 24GL486, ring 4.

are the interiors of the tipi rings. Ring 4 was the only one of the six to possess a fire hearth, composed of a rock ring.

The excavated ring, ring 4, measures 13.5 feet north-south by 14 feet east-west (see pl. 51, *b*; fig. 34). The east-northeast side of the ring presents a gap 1 foot wide, probably a doorway. The circular band of rocks in the ring covers an area about 3 feet wide and consists of 124 rocks, 0.3 to 1.3 feet in diameter.

The tipi ring was staked out in 5-foot squares, with the central axis oriented along the (magnetic) north-south line through the center of the ring, almost bisecting the fire hearth. The southernmost row of stakes was labeled 0N(orth), the next 1N, etc.; numbered left or right of the central axis, square designations were derived from that of the stake in the southwestern corner of each.

Square 2L1, which included a segment of the fireplace, was taken down 0.1 foot, to the base of the rocks in the fireplace ring, presumably the original floor of the tipi (see pl. 52, *a*). The fill consisted of a fairly loose yellowish-gray sandy soil, but at the 0.1-foot level a compact, hard gray layer was encountered. Whether this compact layer, on which lay the rocks of the tipi ring as well as the hearth, resulted from the occupation of the tipi (either from the trampling of the inhabitants, or from the effects of sod destruction, leaving the soil unprotected), or is a natural feature of the region, a hardpan such as is common on the Plains, is uncertain: local soil scientists were unable to settle the question, nor, since the region is undisturbed range, could the experience of farmers be sought. While this layer does appear to extend beyond the tipi ring, it would still remain within the camp area, and so could have been subject to the same trampling that may have packed it within the tipi. Extensive testing of the surrounding region for this feature was impractical within the time available for excavation. Also undetermined is whether the rocks of the tipi ring always lay on this compact layer, soil being deposited around them and eventually covering them, or whether they sank down to it through successive wet seasons; probably both factors were operative.

The remainder of the squares containing the tipi ring were also cleared of the surface material to the 0.1-foot hard gray level. While it appeared that the extremely heavy rocks had embedded themselves deeper into this layer, owing to their weight, the majority of the rocks lay on it. In a typical square, 2L2, 15 rocks of the tipi ring occurred (pl. 52, *b*). Thirteen were approximately 0.6 foot in diameter and were toward the inside of the ring, while two, 0.8 and 1 foot in diameter, lay somewhat outside the ring. In square 1L1 the rocks had been displaced about 0.6 foot because wind action had removed the soil from under them; this formed a section of the small blowout on the south side of the site, mentioned above (pl. 53, *a*).

The only artifact discovered was a rounded stone, apparently from a stream bed, 8.6 by 7.1 by 5.8 cm., with peck marks showing evidence of use as a hammerstone. This occurred 4 feet southwest of the fire hearth, on the hard gray 0.1-foot level. A bone fragment 1.9 by 1 cm. lay also on this surface, in square 2L1, near a small deposit of ash.

The center of the ring was occupied by a rock-ring fire hearth composed of 10 stones, 1 of which was entirely below the surface, and ranged in size from 0.4 to 0.8 foot in diameter. These stones lay on the 0.1-foot level; it was observed that the hard gray layer sloped slightly down to the area midway between the hearth and the outer ring, and consequently these rocks were very slightly higher than the rest of the interior of the ring. Several of the rocks lining the hearth appeared fire-reddened, and one was fire-cracked. Under one of the larger rocks in the northeast portion of the circular ring a small handful of charcoal and charred wood was found. Since the wind appeared to blow from the southwest, it was surmised that here was represented the last remnants of the fire, blown from the hearth but caught under the edge of this rock.

Summary of fieldwork.—As in the case of the historical accounts and the ethnographic material, the archeological information collected on the Backfeet Indian Reservation supports the conclusion that the tipi rings were used to hold down lodge covers.

Sheer numbers of tipi rings alone give testimony that they served a domestic function, rather than having been of occasional ceremonial use. Their location on flat or nearly flat areas in good camping spots, where they appear to have had taken into account, in their placement, factors of drainage, wind, and other climatic influences, support their use as habitation sites. The topographic settings concur with the camping patterns (of which regular plans of a limited number of types were observed) in suggesting seasonal variations in camps, reflecting an annual cycle of activities such as is known from historic tribes.

The size of the tipi rings on the Reservation vary to a limited extent, but the range and the average both coincide with the sizes of lodges used as conical dwellings among the historic tribes. The variations can be explained by both individual owners and by temporal differences. The number of rings in a site approximate the number of lodges in historic camps, changing from season to season in a regular cycle.

No eccentric tipi rings were found, nor any partial or overlapping rings. All the tipi rings observed on the Reservation were suitable in construction and shape for use as lodge-cover weights. The rocks making up the rings were uniform within a restricted range of size, shape, type of material, total numbers, and arrangements, and the aggregate of these features reinforces the surmise that they were weights for the skin lodges. The absence of rocks, in a few of the tipi rings, in a small area toward the east is reminiscent of the historic tribes' tradition of placing a doorway toward the rising sun.

The occurrence of rock concentrations and rock-lined fire hearths in several tipi rings is further evidence of their use as habitations, while the absence of these hearths in numerous rings agrees with native informants' memories of cooking being done outside the lodge.

A comparison between the sizes of tipi rings and the depths to which their rocks are embedded, as well as the total numbers of rings and of sites at different depths, suggests a temporal change in tipi ring size. The change could well be due to the shift in cultural and economic patterns outlined by Lewis (1942, pp. 35–36).

DISCUSSION

It is difficult to understand why archeologists working in the Northern Plains appear to be so confused over tipi rings, lumping several diverse phenomena under this classification, assigning esoteric functions to them, or refusing to hazard hypotheses on their functions at all.

Mulloy is a leading exponent of the "problematical" theory of the nature of tipi rings. Referring to them as "manifestations of unknown relationships," he has summarized his reasons for arriving at this conclusion (Mulloy, 1952, p. 137). A point-by-point discussion of this summary incorporating the evidence previously presented in this paper removes, it is believed, the basis for Mulloy's hesitation and supports the conclusion that tipi rings were indeed lodge-cover weights:

(1) Mulloy states (ibid.): "'Tipi rings' [vary] from five to forty feet in diameter and occasionally larger . . ." Tipi rings found on the Blackfeet Reservation vary in size from 7.5 to 29 feet in diameter,[21] within Mulloy's range but likewise within the range and with the average of lodges used as conical dwellings by historic tribes, and by the modern Blackfoot at their 1956 encampment. Variations reflect owners' and temporal differences.

(2) " 'Tipi rings' . . . are found either isolated or in groups of several hundred." On the Reservation, the rings occur isolated or in groups of up to 170; these variations in camp size result from the seasonal cycle of subsistence and ceremonial observances.

(3) "Frequently they intersect each other so intricately that it is difficult to separate one from the other. Usually they are simple circles, but eccentric forms occur." No tipi rings on the Reservation intersected each other, overlapped, or could be termed an eccentric form, nor could historical or ethnographic sources clarify this assertion. Perhaps this is a trait characteristic of another area, which cannot be solved in north-central Montana.

(4) "Sometimes they occur near camp sites, but rarely are artifacts found in them. . . . [There is a] lack of evidence of habitation in their vicinity." Since tipi rings were occupied for only a short time by nomadic people who would discard very little, an abundance of habitational debris is not to be expected. Reputable collectors report

---

[21] In the autumn of 1956 an amateur collector from Valier, Mont., James Tidyman, brought the writer to a large hill overlooking Two Medicine Creek in the southeastern portion of the Blackfeet Reservation. On the summit of this hill is a stone ring 43.7 feet north-south by 44.5 feet east-west, but differing from other tipi rings only in size. A fire hearth 3.9 by 3 feet is located 19.7 feet from the west, 18.6 feet from the east side. Disturbance of the surrounding land, preventing examination of the lower slopes of the hill, obscured surrounding rings, if any. Carle Leavitt of Conrad recalls visiting, with the late H. P. Lewis, three rings at a site in north-central Montana, which he believes must have been about 60 feet in diameter, and 40 to 50 feet apart, with the rocks deeply embedded in the ground. It has not been possible, so far, to investigate these phenomena sufficiently to reveal their significance—perhaps they were ma'toki dance lodges (see p. 428).

occasional artifacts in them, and one was discovered in the ring excavated by the writer. Many times the rings are in the vicinity of buffalo drive sites; a Blackfoot informant, Bull Head, stated that his people were accustomed to camp near their drives.

(5) "In the Dakotas, some are merely circular depressions in the sod." Maximilian reports observing the use of sod to hold down the lodge covers of the Blackfoot at Fort McKenzie, where suitable stones are lacking.

(6) "Rarely . . . are the remains of fires found in them." Rock concentrations as well as rock-lined fire hearths are frequently found in the center of tipi rings. Native informants, however, recall that cooking was often done outside the lodge. As for the remains of the fire itself, buffalo dung used as fuel would produce a slow, consuming fire leaving very little ash. Furthermore, the wind would be strong enough, in most cases, to remove all ash and charcoal remains—that charcoal which is found is usually a small amount caught under the hearth rocks. (Local ranchers have mentioned that many times, on the day after one on which they have branded cattle, they can find no traces of the branding fire.) Finally, that cooking was commonly done at the buffalo drives, rather than in camp, is evidenced by the charcoal and ash midden built up at these drive sites.

(7) "They lack packed floors." The tipi ring tested for this feature revealed a hard layer at the base of its rocks, which may possibly have been a floor. However, the nature of the sod on the Reservation (like that of much of the Great Plains) is such that packed earth is unlikely to result from relatively short occupancy of an area. At the 1956 Blackfoot encampment, the interiors of the tipis were marked by grass less packed than that outside the lodges.

(8) "They are situated on high river terrace fingers and less frequently in sheltered lowland areas." On the Blackfeet Reservation, tipi rings are found in all topographic settings favorable for camping. Historical and native sources indicate that the Indians lived in the sheltered lowlands in winter, but in spring were forced up on the terraces by flooding. It should also be remembered that tipi rings are very difficult to discover in the brush of the low valleys, and are in greater risk of destruction, from settlers as well as from floods.

(9) "They may be related to so-called 'medicine wheels.'" This topic is discussed in detail in another paper (Kehoe, 1954; see also Dempsey, 1956). Although no medicine wheels occur on the Blackfeet Reservation, they are found in north-central Montana and in Alberta. They can be defined as cairns or circles of stones, from the center of which radiate a number of rows of other stones. Elderly Blackfoot state that they mark the grave or place of death of esteemed members of the tribe, and this is substantiated by historical accounts. Tipi

rings are thus "related" to medicine wheels solely by having been used as weights for the cover of the death lodge, and subsequently forming the basis of the construction of a marker, or "wheel."

Mulloy is further confused by circles of mixed stone and posts, which he encountered in the Yellowstone region (1952, p. 132; 1954, p. 55). These structures are conical, semiconical, rectangular or pentagonal in shape, often supported by trees or cliffs, and constructed of both stone and wood, in toto suggesting an entirely different type of structure from the weighted conical skin tipi. Mulloy believes (1954, p. 55) that "these structures may account for the origin of the prevailing myth in this region that 'tipi rings' have hearths in them, but they are by no means the same thing as the circles."

The 1954 report documents Mulloy's investigation of two "stone circle sites" in the Shoshone Basin, Wyo.[22] In one, containing 75 rings from 11 to 24 feet in diameter, situated on a flat-topped gravel terrace, he mapped and photographed the site and tested one circle by coordinate trenches 2½ feet wide and 3 feet deep. Another ring was tested by being completely excavated to the level of the gravel terrace. In addition, a second site of six rings was investigated but not excavated. The conclusions Mulloy derives from this work are that "stone circles" are still "manifestations of problematical purpose," similar in their occurrence along the eastern edge of the Rockies from New Mexico north to the Canadian border, and that "they might be circles used in dancing, or in other religious rituals" (Mulloy, 1954, p. 55), which may possibly be connected to the "medicine wheel" in the Big Horn Mountains of Wyoming. In sum, Mulloy adduces no new reasons for denying the domestic function of tipi rings as lodge-cover weights, though he is still committed to a belief in an inscrutable esoteric use for the circles, and therefore the rebuttal of his 1952 argument continues to be valid.

A second student of tipi rings, Hoffman, begins his review by cautioning, "In form and use they must be distinguished from somewhat similar structures such as medicine wheels, eagle catches, the Lacotah Love Dance circle, and Koyokee pits" (Hoffman, 1953, p. 1), but later refers to all of these together as "tipi ring forms" (op. cit., p. 10 ff.). Failure to clear the confusion results from his superficial speculations unsubstantiated by cross checking, field investigation of informants' descriptions, or full documentation of these informants' background and reliability. Hoffman makes much of the theory that tipi rings were used as shelters during "medicine getting" quests; these fasting shelters, however, are U-shaped stone constructions large enough to hold a man and high enough to protect him from the wind. They thus cannot be confused, in the field, with tipi-ring circles. Several of these fasting shelters can still be seen today, and have been located on the Blackfeet Reservation. One of the best surviving examples is the shelter of Ear Rings, a Piegan, father of John Bird Earrings, who brought Claude Schaeffer, then curator of the Museum of the Plains Indian in Browning, to this shelter, placed on a hill above Ear Rings' allotment and near his grave. Dr. Schaeffer photographed the shelter at this time (pl. 53, *b*).[23]

---

[22] In a letter dated October 4, 1955, with photographs enclosed, Mr. William McCarty of Laramie, Wyo., sent me a description of a group of tipi rings in southeastern Wyoming (130 miles southeast of Mulloy's study). He wrote: "This group of tipi rings is located on a high bluff with a sheer drop to the west and north and a gradual slope to the east and west (sic). From the high point one can see for miles in any direction. This bluff is located eight miles south of Medicine Bow, Wyoming.... These rings seem to be in groups of three to six and are scattered around the level areas. . . . Rings are about eighteen feet in diameter and are formed of a double ring of stones. . . . At each group is a smaller ring of stones with a fire hole in the center of each.... My wife found a broken arrowhead and my daughter a smaller broken one. Some flints I have picked up show they were worked on and may be crude arrowheads."

Carling Malouf is also noncommittal on the use of tipi rings, but is led to the supposition of a ceremonial function by the lack of hearths and artifacts in so many.[24] Malouf's statement that ethnographic accounts fail to provide sound information on the rings is difficult to comprehend in the light of the evidence presented by informants in a previous section of this paper.

Review of their writings suggests that the hesitation of these students in assigning a domestic function to tipi rings stems from (1) lack of detailed examination and analysis of tipi rings in the field, (2) unfamiliarity with published historical and ethnographic sources and with surviving native knowledge, (3) application of interpretations based on phenomena from a limited area to a large geographical region occupied by a number of tribes representing diverse linguistic stocks, cultural traditions, and geographical connections, in which entirely foreign but superficially similar structures cause much confusion, and (4) an unwillingness to commit themselves on a seemingly controversial topic.

It should be noted, of course, that tipi rings are distributed over an area much greater than the former home of the Blackfoot, to which my conclusions are limited. In other areas and among different tribes, there may be stone circles that served other functions. The archeological past of each area is, to a greater or lesser extent, unique, and must be recognized as disclosing information perhaps inapplicable to any other area. Therefore it is admitted that the hesitation of archeologists such as Mulloy may well be justified in regard to stone circles treated as a phenomenum scattered from New Mexico to Montana; the writer will maintain only that those herein described from the

---

[23] Personal communication, summer of 1953.

[24] Personal letter dated November 7, 1953.

Blackfeet Reservation vicinity were used as lodge-cover weights, or "tipi rings."

The extension of the use of tipi rings as lodge-cover weights to the northern Blackfoot range in Alberta is corroborated by information recorded by Dempsey (1956, p. 177):

> The tipi ring . . . is common in Blackfoot country and has been used within the past two decades by at least two tribes of this nation (Blood and North Peigan) where the owner wished to follow early customs.
>
> The tipi rings were aptly described in 1955 by One Gun, an elderly North Blackfoot informant: "The circles of stones were normally used to hold down the edges of the lodges. The old tipis were made of buffalo skins and were much heavier than the canvas ones. They could not be blown away as easily, so stones were able to hold them in place. But when we started to use canvas, we had to use pegs or our tipis would be blown over. Stones were also used between the pegs."

Dempsey also notes that the Blackfoot word for "medicine wheel" refers only to the radiating lines, the speaker thus assuming that the listener knows, as is inherent in Blackfoot tradition, according to Dempsey, that the lines are "merely appendages to existing tipi rings" (ibid.).

Granting, then, that the question of the function of tipi rings has been answered, at least for the area inhabited by the Blackfoot, problems of cultural affiliation and age still remain for these archeological features. Solutions rest partly on knowledge of the changes in size of the tipis during protohistoric and historic times, and of the size and arrangement of the camps.

For example, Anthony Hendry observed in 1754, while journeying through the Blackfoot country, near the present Calgary, Alberta, a camp which in his description invites comparison with archeological sites (Bushnell, 1922, p. 25):

> Came to 200 tents of Archithinue Natives, pitched in two rows, and an opening in the middle; where we were conducted to the Leader's tent; which was at one end, large enough to contain fifty persons; where he received us seated on a clear [white] Buffalo skin, attended by 20 elderly men. . . . I departed and took a view of the camp. Their tents were pitched close to one another in two regular lines, which formed a broad street open at both ends.

Matthew Cocking, sent west by the Hudson's Bay Company in 1772, writes of this tribe's camp arrangement in connection with a buffalo pound (Bushnell, 1922, p. 26): "Our Archithinue friends came to see us and pitched a small distance from us; on one side the pound 21 tents of them, the other seven are pitched another way." On the Reservation, tipi rings are found associated with buffalo drive sites in similar arrangements. A cluster of nine was located within a few hundred feet and on each side of a buffalo drive site, as diagrammed in figure 35 (see also pls. 49, *a*; 54, *a*).

Deductions on the size of the tipi may be made from observations such as those collected by Lieutenant Bradley from white traders

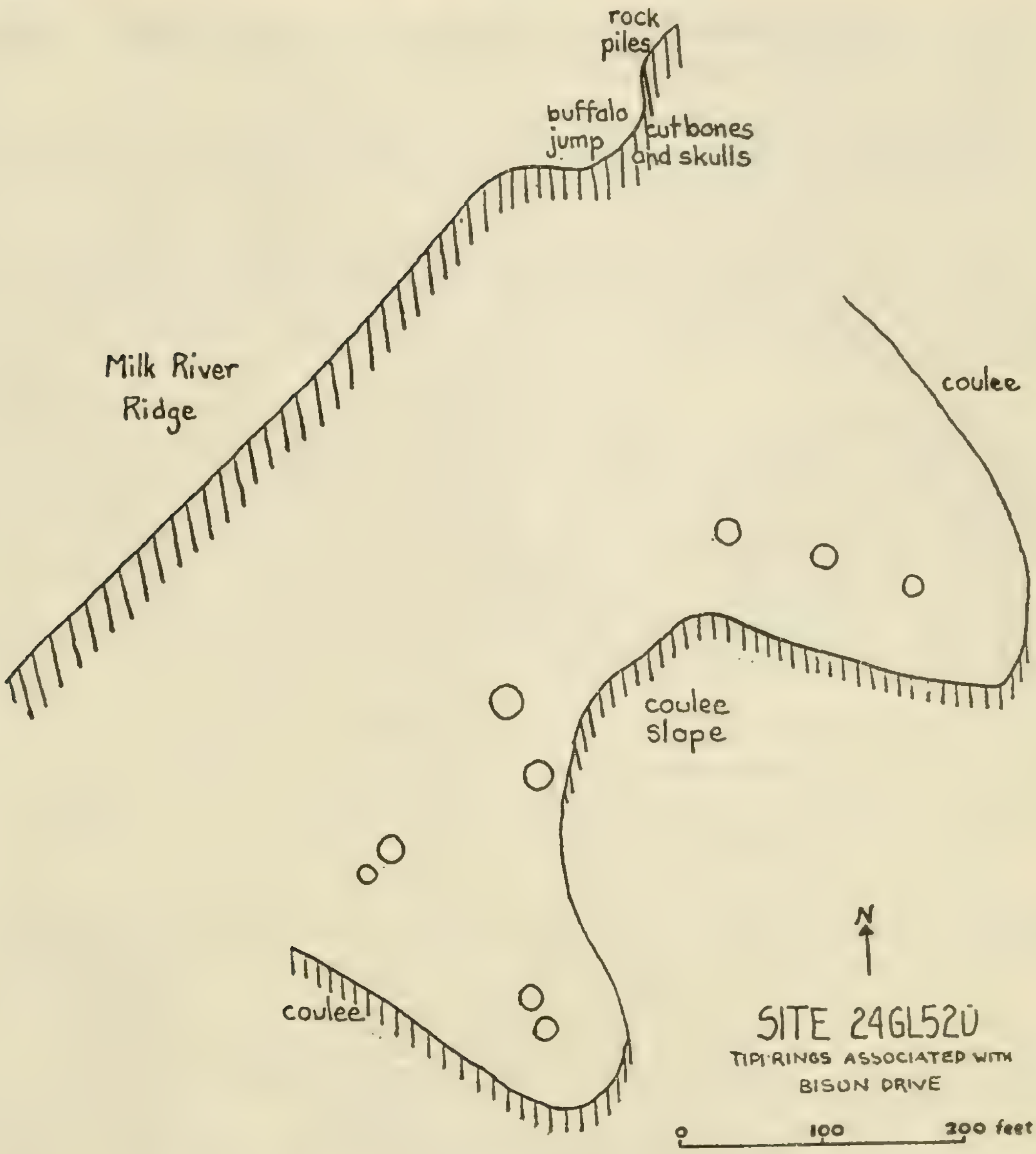

rock piles
buffalo jump
cut bones and skulls
Milk River Ridge
coulee
coulee slope
coulee
N
SITE 24GL520
TIPI RINGS ASSOCIATED WITH BISON DRIVE
0
100
200 feet

FIGURE 35.—Site 24GL520, tipi rings associated with bison drive.

familiar with the Blackfoot from the early decades of the 19th century. He states that about the middle of that century (Bradley, 1900, p. 258):

> From six to twelve skins were ordinarily employed, according to size desired or the wealth of the occupants. The number rarely exceeded twelve but occasionally reached eighteen and twenty, and Major Culbertson relates having once seen one of forty skins that would hold a hundred people. A six-skin lodge was ten feet in diameter, holding six people, while a twelve-skin lodge was about fifteen feet in diameter and afforded shelter to eight or nine persons. The cover was stretched over eight to twelve lodge poles, in the larger lodges from eighteen to twenty, standing in a circle and inclining inward till they joined near the tops at the height of from eight to twelve feet from the ground.

The social organization and annual cycle of subsistence of the various tribes that once camped in the area of the modern Blackfeet Reservation may be reflected in the surviving tipi-ring clusters. Eggan's paragraph (1952, p. 40) is suggestive in this regard:

> Collier has noted that the social organization of the Plains tribes took a series of forms: the camp circle, two types of large bands, the camp based on extended kinship, and the temporary hunting camp, each of which was adapted to the annual cycle of subsistence as well as to the social environment. It is important to note that tribes coming into the Plains with more complex formal social structures were in the process of giving them up in favor of the more flexible band and camp organization; and conversely, the more simply organized Great Basin groups developed a more complex organization.

Using the information from Bradley (1900, p. 258), Lewis (1942, pp. 35–49), and Ewers (1955, pp. 131–134, 307–308), the following table has been worked out to indicate the possibilities of chronological ordering of tipi-ring sites in the area of the Blackfeet Indian Reservation. Study of this table leads to the conclusion that most of the tipi rings on the Reservation date from the 19th century (cf. p. 444, table 2 and paragraph following).

TABLE 3.—*Temporal change in Blackfoot tipi size*

Date	Period	Size of lodge in number of skins	Floor diameter (feet)	Number of—		Reasons
				Occupants	Wives	
Before 1730.	Pre-horse	6–8	About 10	6–8	(?)	Limited traction power of dogs restricts size of lodge; less value in women's labor, more equal sex ratio favors fewer wives, smaller family.
1750	Generation after acquiring horse.	"Larger"	(?)	One family to a tipi; "leader's" holds 50.	Probably 1–4.	Horse permitted transportation of larger lodge, more lodges to a group.
1830	Fur trade expansion.	Average 6–12	10 to 14 or 16.	Average 6–10.	Average 3	Polygyny increasing due to value of female labor in processing hides, high death rate of men in warfare; greater wealth in horses makes possible more luxurious lodges.
		Wealthy 18–20.	About 16	Large family.	6–16	
		Extreme 40	30	Up to 100		
1870	Competitive fur trade.	Beginning of abandonment of skin tipi for canvas lodge.	30	Up to 100	Up to (rarely) 20 or 30.	Intensification of factors cited above.
1956	Present	Canvas lodge	15–22.5	7–10	1	Erected only for traditional dancing celebration's weekend encampment; many lodges family heirlooms, put up in memory of deceased relatives.

CONCLUSIONS

The material of this paper comprises a preliminary attempt to gather historical, ethnographic, and archeological evidence illuminating the function of the tipi rings in the area of the Blackfeet Indian Reservation of Montana. Because of the once much greater territory of the Blackfoot, the historical accounts cover a much greater area and include information on some of the peripheral neighbors and allies of the Blackfoot. The ethnographic evidence was obtained from early ethnological works and, principally, from the testimony of elderly Blackfoot now living on the Reservation and on Canadian reserves, as well as from a few members of neighboring tribes. Archeological data has been recorded from sites located in and around the Blackfeet Reservation, north-central Montana.

Well-documented historical records, statements of surviving participants in the traditional Indian customs, and the archeological evidence all support the conclusion that the stone circles known as tipi rings resulted from the use of rocks to hold down skin lodge covers, at least in the region of the Blackfeet Reservation.

There is still a need for interpretation of the data on tipi rings. Contemporary archeologists tend to use the term "tipi ring" as a catchall to pigeonhole problematical stone configurations of unknown functions, without seriously attempting to ascertain what such functions might be. As a result, the simple stone circle or tipi ring has acquired a mysteriousness and obscurity of meaning comparable to that surrounding the more eccentric stone configurations. The problem is largely one of semantics, and could be considerably clarified by limitation of and agreement on definitions and categories. As a start, the work incorporated in this paper suggests that the use of the term "tipi ring" should be limited to an approximately regular stone circle, between about 7 to about 30 feet in diameter (the range ultimately determined by the size range of tipis as this becomes known), averaging about 16 feet, the boulders of the circle being of a size and weight suitable for securing a lodge cover. Rock-lined hearths may be present, but more commonly are not. That the other, various stone configurations now often erroneously lumped under the term "tipi ring" had diverse functions, some utilitarian, some ritualistic, is revealed by historical and ethnographic sources which should be employed to supplement archeological work on these relatively recent phenomena.

The solution to the problems presented by the stone configurations, including tipi rings, appears to lie in intensive investigations of the several types in a number of limited areas. If there is preliminary agreement on the classification of these configurations, and use is fully made of the three branches of study forming the three main sections of this paper, comparisons of the results of the investigations in each area should throw considerable light on the history and ways of life of the many tribes once occupying the vast area in the West in which the boulder configurations of unknown function are now found.

APPENDIX

A MODERN BLACKFOOT CAMP

On the morning of August 8, 1956, the Blackfoot began erecting lodges for their annual North American Indian Days Celebration (August 8–13, 1956) immediately to the rear of the Museum of the Plains Indian, in Browning, Mont. (see pl. 55, *a*). This celebration has replaced the Fourth of July gathering of previous years, and now coincides with the season of the annual Sun Dance assemblage of the historic tribes, in which the various bands of the tribe camped in one village in the form of a circle of lodges.

The summer season, usually beginning in June and ending in September, was the only time of the year when the entire tribe was encamped in a single village, using the camp circle. During the other seasons the several bands occupied different camps and used other arrangements of lodges (Ewers, 1955, p. 128). Similarly, the contemporary Blackfoot come together only once or twice in one village, during the summer season, and here use the camp circle. The remainder of the year finds them living in their various rural communities on the Reservation.

August 8 and 9, the first 2 days of the encampment, provided opportunities to secure detailed information and photographs of the erection of the lodges (pl. 54, *b*). By August 10 all the lodges were standing: 39 canvas tipis of the 4-pole type, 69 wall tents, and 2 umbrella tents. On this day, with the aid of Lloyd Torgerson of Ethridge, Mont., detailed aerial photographs, both oblique and horizontal, were obtained of the camp (pls. 55, *a*; 56, *b*). In the course of the same flight, a tipi-ring site, 24GL350, the rings of which formed a camp circle partially destroyed by road building, was photographed for comparison with the modern camp, which was subsequently mapped (figs. 36, 37; pl. 56, *a*). (During the previous autumn the 63 tipi rings at this site had been whitewashed for this purpose by an Indian crew under the writer's supervision—see pl. 55, *b*.)

From August 8 through August 13 visits were made to the various lodges of the encampment. Upon entering Lodge 26, owned by Mrs. Mae Williamson, it was discovered that rocks were being used to hold down the canvas liner of the lodge (pl. 57). These liners or back walls "serve to keep out the wind and water that may find its way down the poles from their tops. They protect the people from draughts, as air can enter under the edge of the tipi, pass upward between the cover and the back wall and out over their heads, affording ventilation

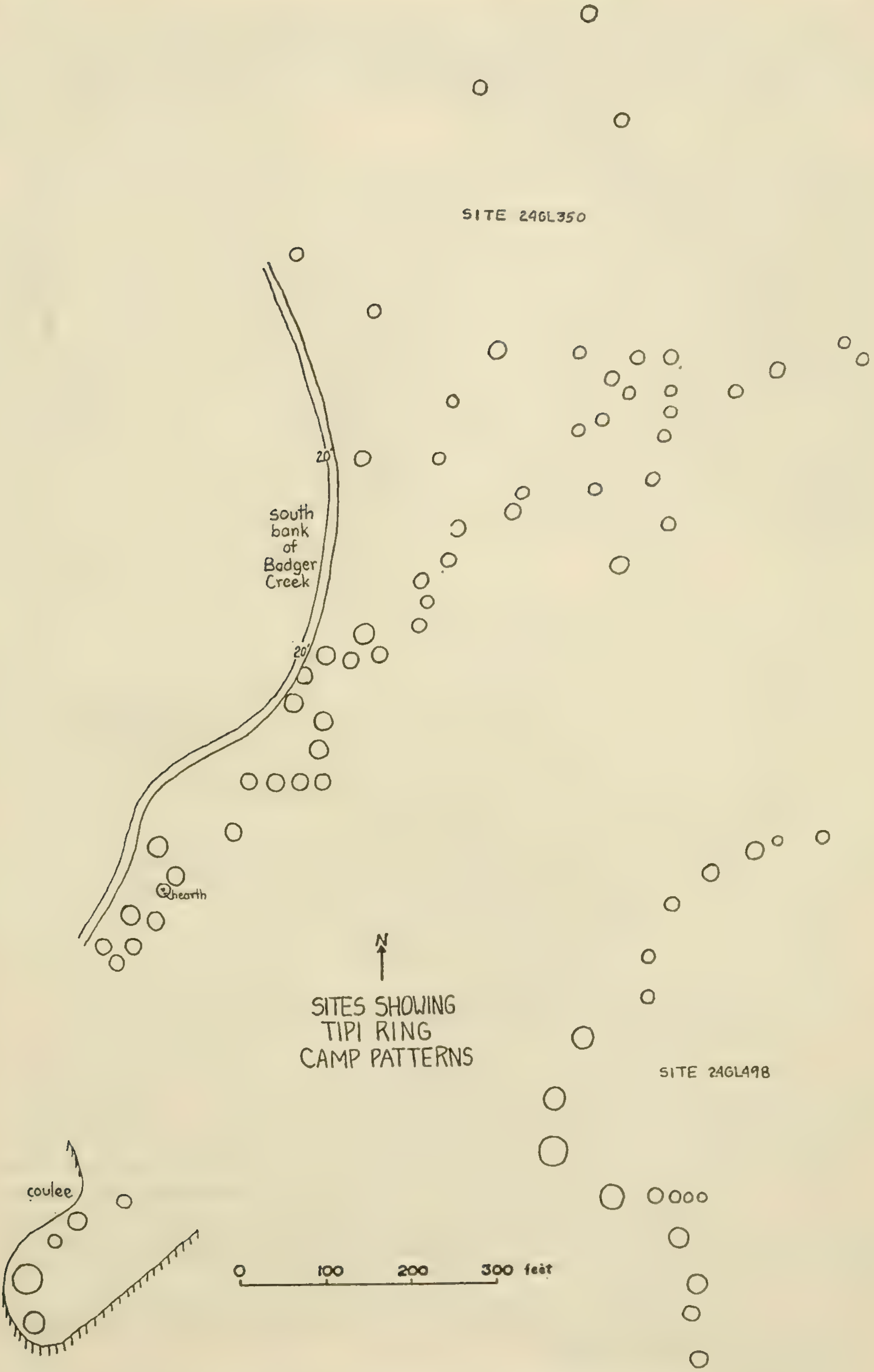

SITE 24GL350
20'
South bank of Badger Creek
20'
hearth
N
SITES SHOWING TIPI RING CAMP PATTERNS
SITE 24GL498
coulee
0
100
200
300 feet

Figure 36.—Sites showing tipi-ring camp patterns.

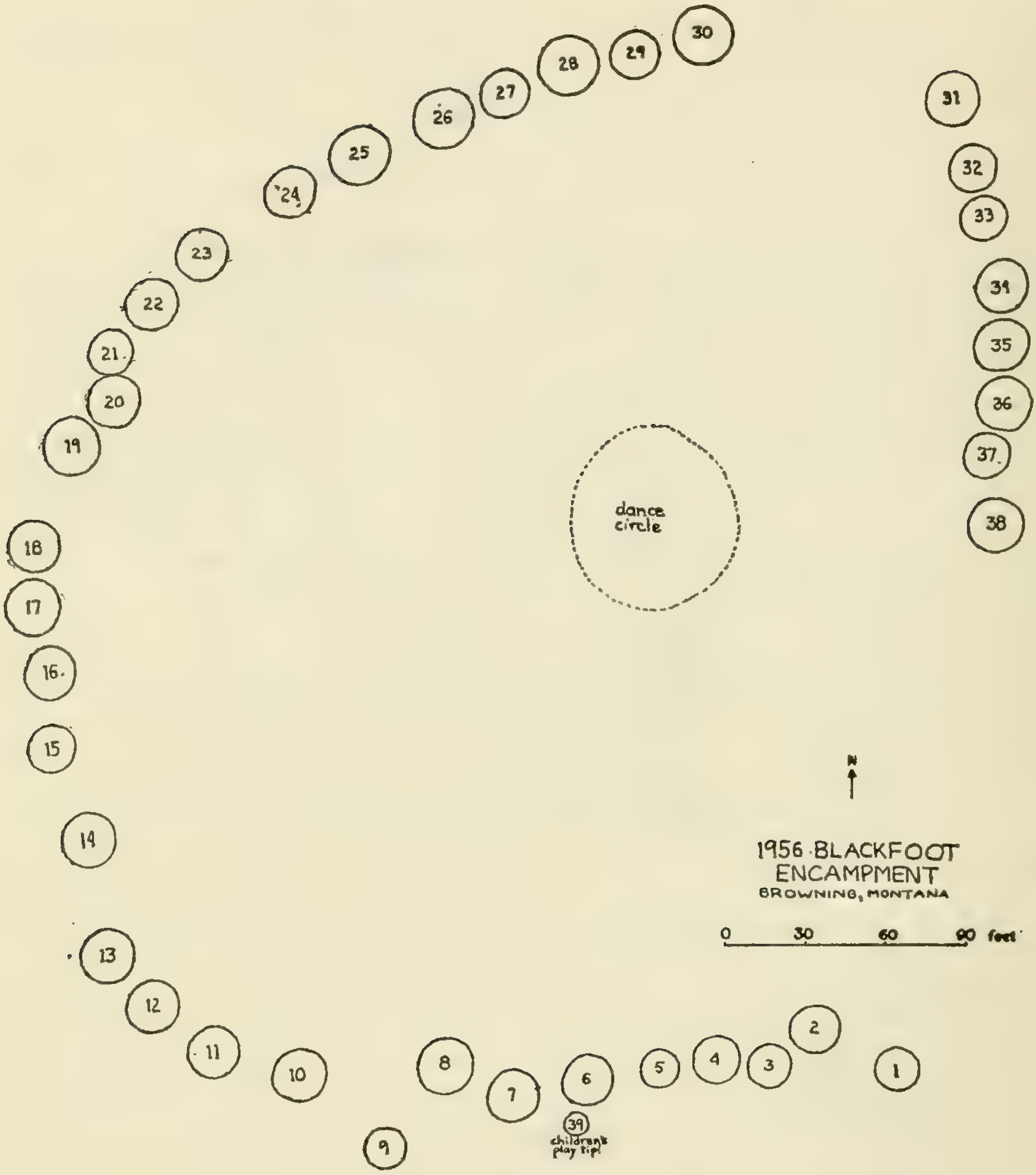

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
children's play tipi
dance circle
N
1956 BLACKFOOT ENCAMPMENT
BROWNING, MONTANA
0 30 60 90 feet

FIGURE 37.—Camp plan, 1956 Blackfoot encampment, Browning, Mont.

of the most approved type" (Wissler 1910, p. 106). Questioning of Mrs. Williamson elicited this information:

> The rocks were used to hold down and push out the tipi liner similar to their use in the old days. Quite a few of the other campers were using them too but most of them were too lazy to gather rocks since they were not easily found at the Browning camp ground. Filled parfleches are often used to push out the inside liner.

Mrs. Nora Spanish, manager of the Blackfeet Arts and Crafts Association, revealed that:

> The North Blackfeet from Gleichen, Alberta, have discovered a new idea to peg the lining similar to the way the tipi cover is pegged to the ground, and loops are now being sewn on the tipi liner for that purpose. A woman from Gleichen told me this in 1955, but claimed that it is much harder to peg the inside liner than

the tipi cover, so rocks will continue to be used in most cases. There would be less wear on the liner with pegs than in using rocks. I have never seen pegs used to push out a tipi liner here on the Reservation, just rocks or parfleches, or both. I am going to sew loops on Mother's (Julia Wades-in-the-Water) tipi liner and use pegs next year.

The Blackfoot began to break camp on the morning of Monday, August 13. At this time measurements were taken of each tipi's floor dimensions, from peg to peg north-south and east-west, tabulated in table 4, and the distances between each of the lodges were noted (table 5); these relationships can be seen in figure 37. It was noticed that after removal of the lodge inner liner, with the tipi cover and pegs, rings of stones remained in place or slightly inside (0.3 to 1.2 feet displacement) their former position against the tipi poles and pegs (pls. 58, 60, *a*). It was rare, although it did occur, that the rocks were found outside the peg line: in these instances their distance from the peg line was 0.3 to 0.6 foot. Unquestionably, the tipi rings at this camp resulted from the pulling out of the canvas liner from the rocks placed on it as weights.

Thirteen lodges left these tipi rings (table 6), with stones ranging from a total of as few as 5 to as many as 40 comprising each ring. The individual rocks varied from 0.3 to 1.2 feet in diameter and were angular stream-rolled boulders identical to those forming the tipi rings on the archeological sites previously discovered on the Reservation.

Later, after the Blackfoot had vacated the camp ground, the area was thoroughly examined. In 22 of the 39 sites of former tipis, fire hearth remains were visible (pls. 59, *b*; 60, *a*). Of these, 17 were unlined, 4 had boulders placed to confine the fire, and 1 had a single brick. Where the hearth was unlined, large metal cans were sometimes used instead to confine the fire, forming improvised stoves which still left a burned area and ashes on the ground; similarly, an inverted washtub "stove" (pl. 59, *a*) left hearth remains (pl. 60, *a*). In at least one tipi (Mrs. Williamson's Lodge 26), however, a commercial stove was employed, which left no evidence of fire afterward. It appeared that for many hearths the sod had been scraped away before a fire had been built, but one hearth seemed to have had dirt thrown on its fire to put it out.

The fire hearths ranged from 0.8 to 3 feet in diameter. For 15, the east-west dimension was the larger; 2 were longer north-south; in the remaining 5, both measurements were exactly the same. The boulder rings of the lined hearths contained 5 to 14 rocks, 0.6 to 1.1 feet in diameter.

The hearth was usually directly between the north and south sides of the lodge, but occasionally was closer to one or the other side. In all but one case, the fire was nearer to the east side of the tipi, the doorway. It was never exactly in the middle of the east-west line, and in the one exception was closer to the west side than the east. This exception was Lodge 29, which, although erected by the Blackfoot with their four-pole construction, was occupied by visitors from the Umatilla Reservation, Oreg., who built their hearth apparently according to their own tradition: five unusually large rocks (0.6 to 1.1 feet in diameter) placed in a semicircle with the opening to the east, and the whole, as before noted, closest to the west side of the lodge. In this, as in the hearths of the other two Umatilla lodges, charred logs suggested that the visitors were not as thrifty of wood as their Blackfoot hosts, at whose fireplaces only small scraps of tinder could be discovered.

A peculiarity of the camp ground after the removal of the lodges was the evidence of their former location: rings of tall grass. Although the grass was much trampled for a couple of feet around both the interior and the exterior of the tipis, at the peg line itself it remained noticeably unbroken, except for the area of the doorway, in which it was badly worn down (pl. 60, *b*).

The tipi sites were carefully searched for both perishable and imperishable remains. Of the former, wood, papers, cloth, wooden tent pegs and skewers, eggshells, orange and lemon skins, a partially burnt, child's beaded moccasin and a woman's slipper were discovered; of the latter the campsite produced hearths (burnt earth, charcoal, charred wood, ash and fire-cracked or reddened rocks), burnt as well as unburnt bone fragments, pieces of glass and metal (principally food containers), corn kernels, fruit stones, a seed (probably sunflower), and a bead.

Examination of the 1956 Blackfoot encampment in conjunction with investigation of archeological tipi ring sites on the Blackfeet Reservation leads to the inevitable conclusion that the phenomena are truly homologous (pl. 59, *a*, *b*), resulting from the identical cause, the use of rocks as weights in anchoring tipis. The minor differences between the modern and the older sites are attributable to the innovations introduced into Indian life by today's civilization (e. g., stoves, metal tools, and food containers), or to the "ceremonial" aspects of the modern camp, in which several of the tipis were erected in memory of former, now deceased owners, or as showplaces, but not actually lived in, while none were intended to be more than temporary shelter during a 4-day holiday. Thus, study of the modern camp not only presents and indicates the trend for (refer to Mrs. Spanish's statement) an interesting survival of the tradition of using rocks as weights for tipis, now restricted to anchoring the inner lining; but it also illuminates the archeological tipi-ring sites, corroborating the testimonies of early travelers and elderly informants, and indicating that the tipi rings are closely accurate markers of the sites and dimensions of the lodges of the aboriginal inhabitants of the region in which lies the Blackfeet Indian Reservation.

TABLE 4.—*Tipis in 1956 Blackfoot encampment*

Tipi No.	Owner	Tribe	East-west (feet)	North-south (feet)
1	Martin Sutta (Idaho)	Nez Perce?	16.4	15.4
2	Sister of Rides at the Door	Blackfoot	18.4	19.6
3	Dan Bull Plume	do	17.7	17.0
4	Jim Rider	do	17.6	18.0
5	Louie Fish	do	15.0	14.8
6	Fish Wolf Robe	do	19.0	19.1
7	Mary Black Man	do	18.8	18.0
8	Pete Butterfly	do	21.9	20.0
9	Rose Big Beaver	do	16.0	15.7
10	Charlie Horn	do	21.4	20.3
11	Iron Breast	do	19.5	19.5
12	Richard Little Dog	do	19.7	19.7
13	Paul Old Chief	do	20.0	20.6
14	Louise Croff	do	21.0	21.0
15	Cecile White Calf	do	18.0	17.6
16	Otter Woman	do	19.0	19.5
17	Theodore Last Star	do	21.7	19.4
18	Pete Running Crane (deceased)	do	20.0	19.5
19	Phillip Arrow Top	do	22.7	----------
20	Juniper Old Person	do	17.8	18.4
21	Grace Kennedy	do	17.0	16.5
22	Cecile McNabe	do	18.8	20.2
23	Cecile White Man	do	19.4	18.7
24	Charlie Reevis	do	19.7	19.75
25	Mrs. Jim White Calf	do	22.1	20.5
26	Mae Williamson	do	22.5	21.4
27	Mae Williamson	do	17.85	19.1
28	Eliza Bill	Umatilla	23.3	21.8
29	Louise Showaway	do	18.2	17.4
30	Gertrude Williams	do	21.4	20.7
31	Mary Ground	Blackfoot	19.5	19.3
32	Alan White Grass	do	18.0	17.6
33	Francis Red Horn	do	18.0	17.0
34	Jim Weasel Tail	do	19.6	20.0
35	Susan Tennywash	(?)	20.4	20.6
36	Louis Bear Child	Blackfoot	19.7	20.8
37	Rachel Big Lake	(?)	16.4	17.0
38	Sam Spotted Deer	(?)	20.7	20.4
39	Probably Fish Wolf Robe (child's play tipi)	Blackfoot	7.5	7.5

TABLE 5.—*Distance between tipis, 1956 Blackfoot encampment*

Tipi No.	Distance between (feet)
1–2	17.4
2–3	3.5
3–4	2.0
4–5	4.6
5–6	10.0
6–7	10.5
7–8	7.0
8–9	20.0
9–10	25.0
10–11	14.5
11–12	12.0
12–13	7.0
13–14	24.5
14–15	20.0
15–16	9.6
16–17	5.6
17–18	1.5
18–19	19.6
19–20	2.5
20–21	0
21–22	2.7
22–23	7.0
23–24	22.5
24–25	9.4
25–26	12.7
26–27	5.0
27–28	7.0
28–29	5.4
29–30	6.3
30–31	77.0
31–32	8.0
32–33	2.9
33–34	8.7
34–35	1.5
35–36	1.5
36–37	1.5
37–38	7.0

TABLE 6.—*Tipi rings, 1956 Blackfoot encampment*

Tipi No.	Number of rocks	Size of rocks (feet)	Feet from peg line	Side of peg line	Remarks
2	35	0.3-0.7	0.3-0.6	Both	
5	8				
8	8	.4- .6			Fruit and peg also.
11	9				
14	33	.3-1.2	0- .6	Inside	
15	7		0-1.0	do	
19	13	.3-1.2			
23	5	.6- .8			
25	5		.4-1.0	do	Tent peg in ring.
26	40	.3- .8	.3-1.3	do	
31	30				
33	25				Piled in center.
36	20				Piled in center; anchor pole present; shoe heel in pile of rocks also.

TABLE 7.—*Fire hearths, 1956 Blackfoot encampment*

Tipi No.	Hearth		Rocks		Diameter (feet)		Number of feet from tipi side—				Artifacts
	Unlined	Lined	Number	Size (feet)	N-S	E-W	To E	To W	To N	To S	
[1] 1		×	4	0.6-1		3.5					
1	×				2.3	2.5	6.3	7.6			Glass, bone, corn, wood, metal.
2	×				1.9	2.0	7.0	9.4	8.7	9.0	
3	×				2.1	2.4	7.0	8.3			
4	×				1.9	2.1	7.0	8.5	8.1	8.0	
5		×	1	[2]	2.2	2.3	5.5	7.0	6.5	6.3	Charcoal, ash, burnt earth, glass, metal, peach stone.
6	×				1.8	2.5	7.3	9.2	8.3	9.0	Charcoal, ash, glass, seed, corn, pebbles, peach stone.
7	×				1.3	2.1	7.0	9.7	9.0	7.7	Ash, burnt earth.
13	×				.8	1.0	7.4	11.6	8.5	11.3	Ash, bone, eggshell, peach stone.
14		×	15	.4-1.0	2.8	3.0	8.8	9.2	8.6	9.6	Charcoal, ash, burnt earth, fire-cracked rocks, metal.
16		×	14	.4- .6	2.0	2.2	7.6	9.2	8.5	9.0	Charcoal, ash, wood, metal, cloth.
19	×				1.7	1.8	7.5	13.4	10.0	10.9	Charcoal, ash, wood, metal, lemon skin.
21	×				1.5	1.2	5.5	10.3	6.5	8.5	Charcoal, ash.
22	×				1.8	1.8	7.7	9.3			Charcoal, ash, burnt earth.
23		×	12	.4- .7	2.0	2.2	7.3	9.9			Charcoal; U-shaped (gap W).
24	×				1.8	1.8	7.0	10.9	9.95	8.0	Charcoal, burnt earth.
28	×				2.8	3.0	9.2	11.1	9.5	9.5	Burnt earth and bones, logs, metal.
29		×	5	.6-1.1	2.5	2.5	8.4	7.3	6.8	8.1	Logs, metal; semicircular.
30	×				2.3	2.3	8.0	11.1	9.3	9.1	Charcoal, logs.
31	×				2.0	2.0	7.5	10.1	8.8	8.5	Charcoal, ash, burnt earth.
32	×				2.2	2.3	6.9	8.9	7.1	8.2	Charcoal, burnt earth, metal.
34	×				2.0	1.9	8.0	9.7			Charcoal.
38	×				1.0	1.5	9.0	10.2	10.0	9.4	Metal, cloth.

[1] Hearth was 6 feet southeast of Lodge 1; tin cans and bottles near it suggest cooking was done here, also. Note: None of the other sites yielded remains except Lodge 37, in which a rock and a peach stone were found.

[2] Brick.

LITERATURE CITED

Alden, William C.

1912. Pre-Wisconsin glacial drift in the region of Glacier National Park, Montana. Geol. Soc. America Bull., vol. 23, pp. 687–708.

Bliss, Wesley L.

1949. Archaeological reconnaissance in Wyoming and Montana, 1946–1947. Fifth Plains Conf. Archaeol., Proc. Notebook 1, pp. 7–12.

Bradley, James H.

1900. Affairs at Fort Benton. Montana Hist. Soc. Contr. 3.

Bushnell, David I., Jr.

1922. Villages of the Algonquian, Siouan, and Caddoan tribes west of the Mississippi. Bur. Amer. Ethnol. Bull. 77.

Dawson, George Mercer.

1875. Report on the geology and resources of the region in the vicinity of the forty-ninth parallel, from the Lake of the Woods to the Rocky Mountains. British North American Boundary Commission. Rep.

Dempsey, Hugh A.

1956. Stone "medicine wheels"—memorials to Blackfoot war chiefs. Journ. Washington Acad. Sci., vol. 46, pp. 177–182.

Denny, Sir Cecil.

MS. The birth of Western Canada. MS. (n. d.) Provincial Archives, Government of Alberta, Edmonton.

Eggan, Fred R.

1952. The ethnological cultures and their archeological backgrounds. *In* Archeology of Eastern United States, J. B. Griffin, ed. Chicago.

Ewers, John C.

1944. The story of the Blackfeet. U. S. Office Indian Affairs, Indian Life and Customs Pamph. 6. Lawrence, Kans.

1949. The last bison drives of the Blackfoot Indians. Journ. Washington Acad. Sci., vol. 39, pp. 355–360.

1955. The horse in Blackfoot Indian culture. Bur. Amer. Ethnol. Bull. 151.

Grinnell, George Bird.

1892. Blackfoot lodge tales. New York.

Hewes, Gordon.

1948. Early tribal migration in the northern Great Plains. Plains Archeol. Conf. News Letter, vol. 1, No. 4, pp. 3–12.

Hilger, Sister M. Inez.

1952. Arapaho child life and its cultural background. Bur. Amer. Ethnol. Bull. 148.

Hind, Henry Youle.

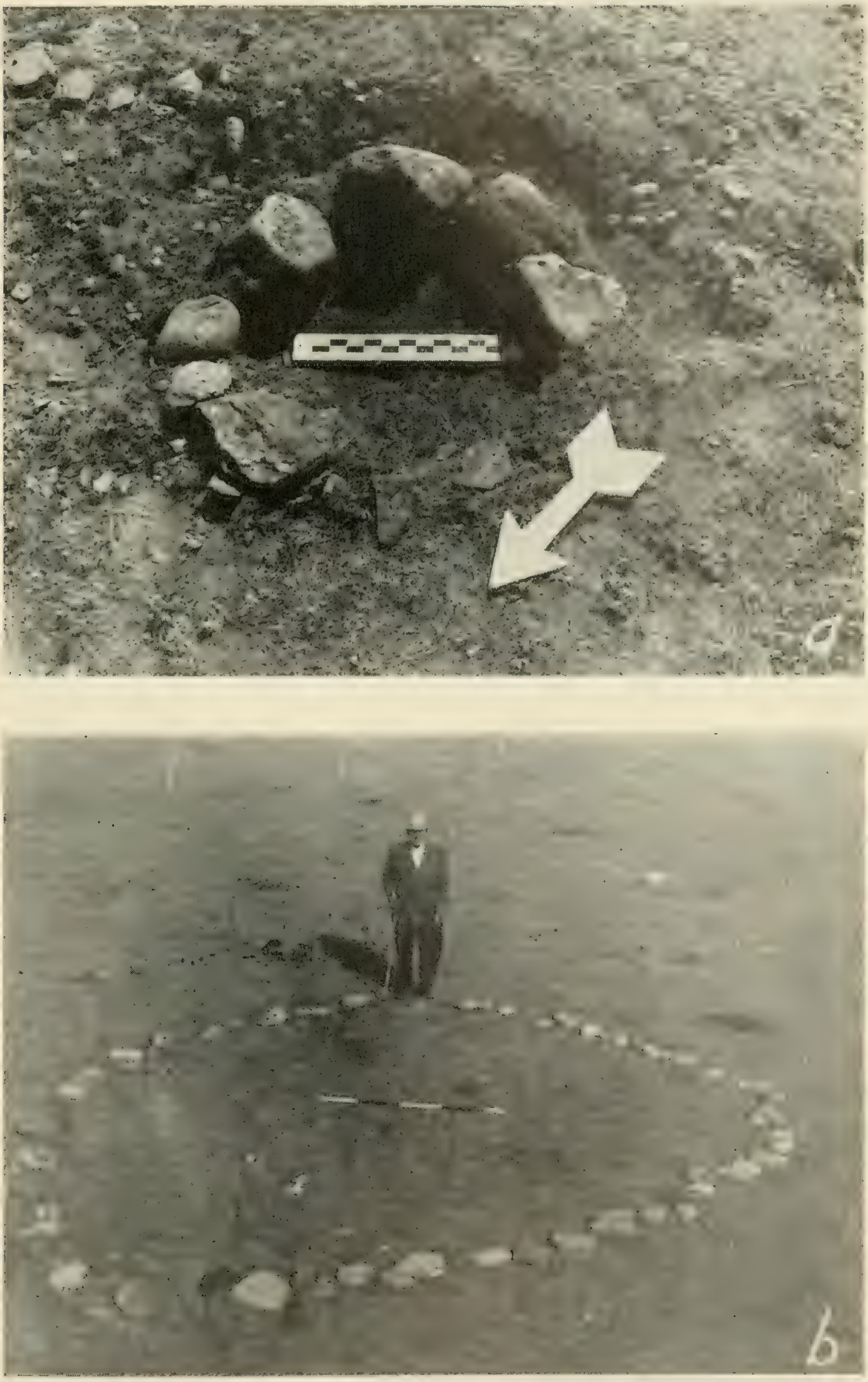
1860. Narrative of the Canadian Red River Exploring Expedition of 1857 and of the Assiniboine and Saskatchewan Exploring Expedition of 1858. Vol. 1. London.

Hoffman, J. Jacob.

1953. Comments on the use and distribution of tipi rings in Montana, North Dakota, South Dakota and Wyoming. Montana State Univ. Anthrop. and Sociol. Pap. 14.

JENNINGS, JESSE D.
1948. Plainsmen of the past, a review of the prehistory of the Plains. Omaha, National Park Service Region 2, Missouri River Basin Recreation Survey.
KEHOE, THOMAS F.
1954. Stone "medicine wheels" in southern Alberta and the adjacent portion of Montana: Were they designed as grave markers? Journ. Washington Acad. Sci., vol. 44, pp. 133–137.
1955. Museum of the Plains Indian Newsletter, vol. 1, No. 2. Browning, Mont.
KRIEGER, ALEX D.
1956. Early Man: Alberta. Amer. Antiq., vol. 21, No. 4, p. 450.
LEWIS, H. P.
MS. Bison kills in Montana. Copy (n. d.) in Museum of the Plains Indian Library, Browning, Mont.
LEWIS, OSCAR.
1942. The effects of White contact upon Blackfoot culture. Amer. Ethnol. Soc. Monogr. 6.
LEWIS, T. H.
1889. Stone monuments in southern Dakota (with report of discussion by members of the Anthropological Society). Amer. Anthrop., vol. 2, pp. 162–165.
1890. Stone monuments in northwestern Iowa and southwestern Minnesota. Amer. Anthrop., vol. 3, pp. 272–274.
LOWIE, ROBERT H.
1922. The material culture of the Crow Indians. Anthrop. Pap. Amer. Mus. Nat. Hist., vol. 21, pp. 201–270.
MALOUF, CARLING.
MS. Montana archeology. MS. (n. d.) lent by author.
MAXIMILIAN, PRINCE OF WIED, *see* Wied Neuwied, Maximilian Alexander Philip, Prinz von.
MCCLINTOCK, WALTER.
1910. The Old North Trail. London.
1936. The Blackfoot tipi. Southwest Museum Leaflet 5.
MCLEAN, JOHN.
1896. Canadian savage folk. Toronto.
MULLOY, WILLIAM T.
1952. The Northern Plains. *In* Archeology of Eastern United States, J. B. Griffin, ed. Chicago.
1954. Archaeological investigations in the Shoshone Basin of Wyoming. Univ. Wyoming Publ., vol. 18, No. 1.
PHILLIPS, PAUL C., EDITOR.
1927. John R. Barrow: A Wisconsin youth in Montana, 1880–1882. Sources of Northwest History 1, Montana State Univ. Hist. Reprints.
SCHULTZ, JAMES WILLARD.
1907. My life as an Indian. New York.
SMITH, J. RUSSEL.
1925. North America. New York.
SPECK, FRANK G.
1928. Notes on the functional basis of decoration and feather technique of the Oglala Sioux. Mus. Amer. Indian, Heye Foundation, Indian Notes, vol. 5. No. 1, pp. 1–42.

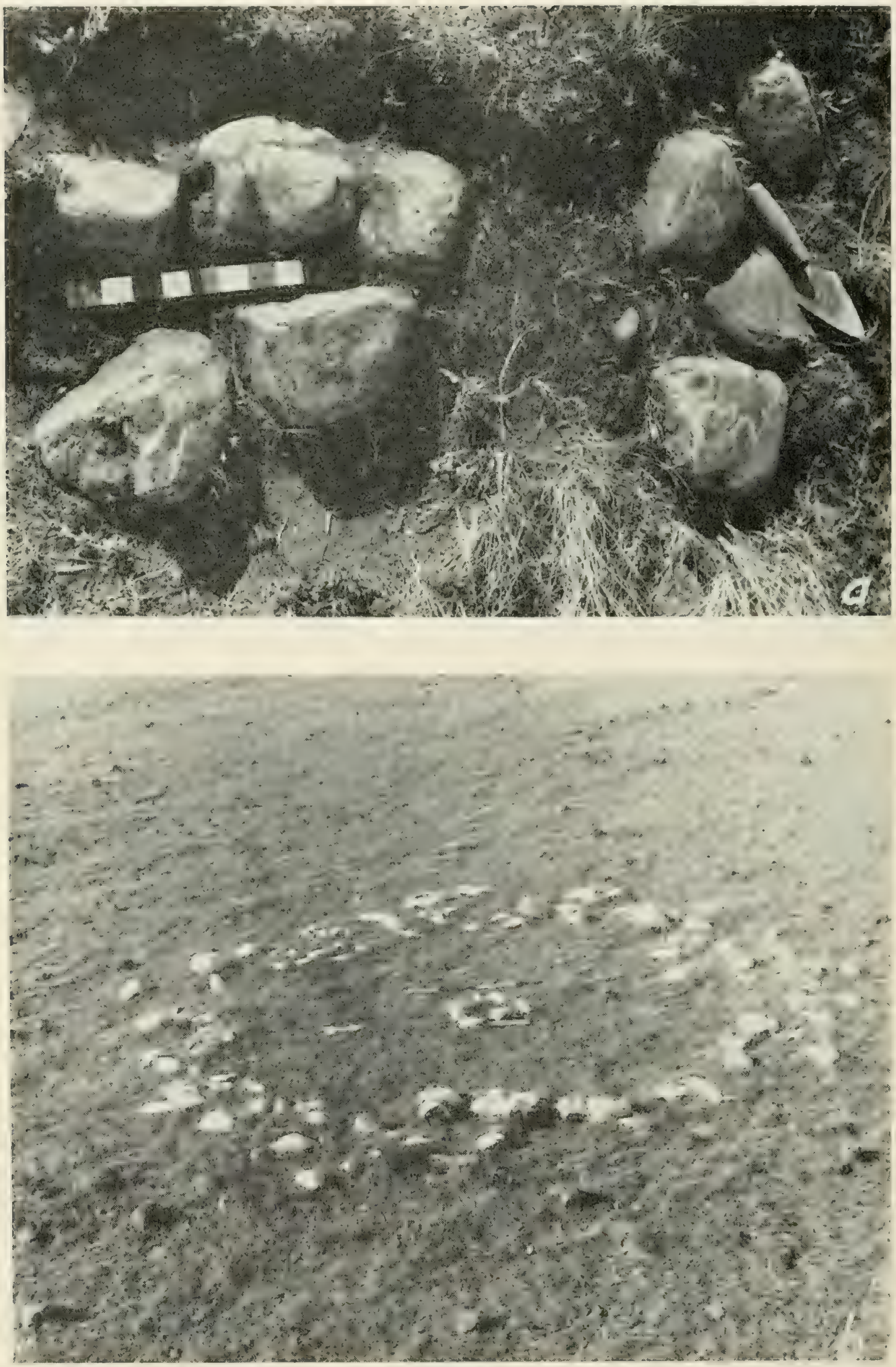
SWANTON, JOHN R.
1952. The Indian tribes of North America. Bur. Amer. Ethnol. Bull. 145.
UNITED STATES DEPARTMENT OF COMMERCE WEATHER BUREAU.
1953. Local climatological data, Great Falls, Mont., 1952. Kansas City.
WEDEL, WALDO R.
1948. Prehistory and the Missouri Valley Development Program. Smithsonian Misc. Coll., vol. 111, No. 2, 52 pp.
1953. Review of Mulloy's "The Northern Plains." Amer. Antiq., vol. 19, pp. 178–179.
WIED NEUWIED, MAXIMILIAN ALEXANDER PHILIP, PRINZ VON.
1906. Travels in the interior of North America in the years 1832, 1833, and 1834. Part 1. *In* Early Western Travels. Reuben Gold Thwaites, ed. Vol. 23. Cleveland.
WILL, GEORGE F.
1924. Archaeology of the Missouri Valley. Anthrop. Pap. Amer. Mus. Nat. Hist., vol. 22, pt. 6.
WISSLER, CLARK.
1910. Material culture of the Blackfoot Indians. Anthrop. Pap. Amer. Mus. Nat. Hist., vol. 5, pt. 1.
1913. Societies and dance associations of the Blackfoot Indians. Anthrop. Pap. Amer. Mus. Nat. Hist., vol. 11, pt. 4.
WITHERS, ARNOLD.
1950. Survey in Eastern Colorado—University of Denver. Proc. Sixth Plains Archeological Conference (1948). Univ. Utah, Anthrop. Pap. No. 11, pp. 10–11.



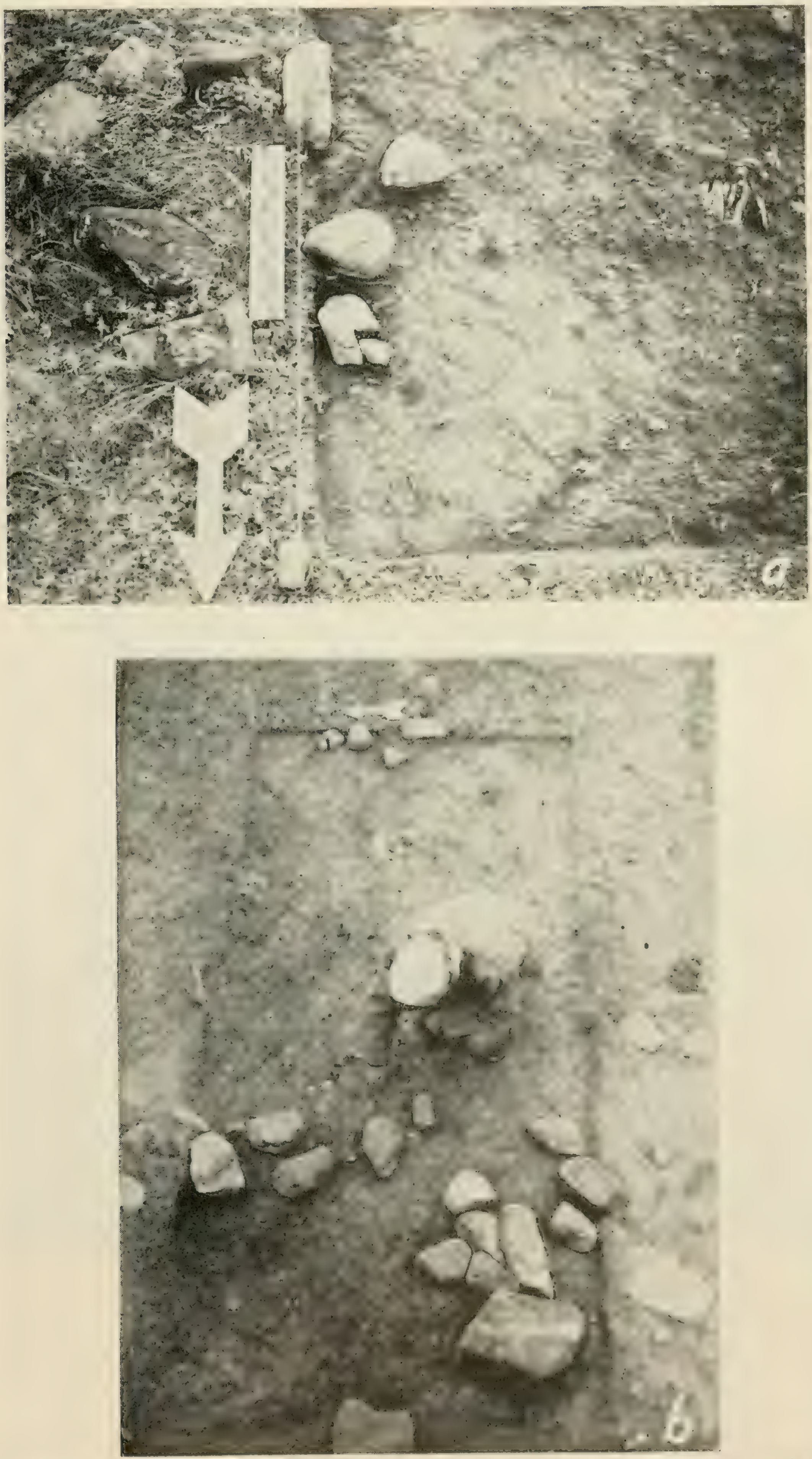
a, Site 24GL390. Boulder-lined fire hearth excavated in the center of tipi ring overlooking Greasewood Creek. Rocks were absent in west portion of fireplace; occupational material consisted of small charcoal particles. *b*, Adam White Man standing in the doorway of the tipi ring identified as belonging to his father. Arrow points east, to the spot described as the fire hearth; rocks in upper right mark outside cooking hearth. (See fig. 29.)

a, Site 24GL520. Looking down from a bison drive on the south side of Milk River Ridge. Six of a group of nine tipi rings may be seen between bottom of picture and automobile See fig. 35.) *b*, Site 24GL490. Testing boulder-lined fire hearth.

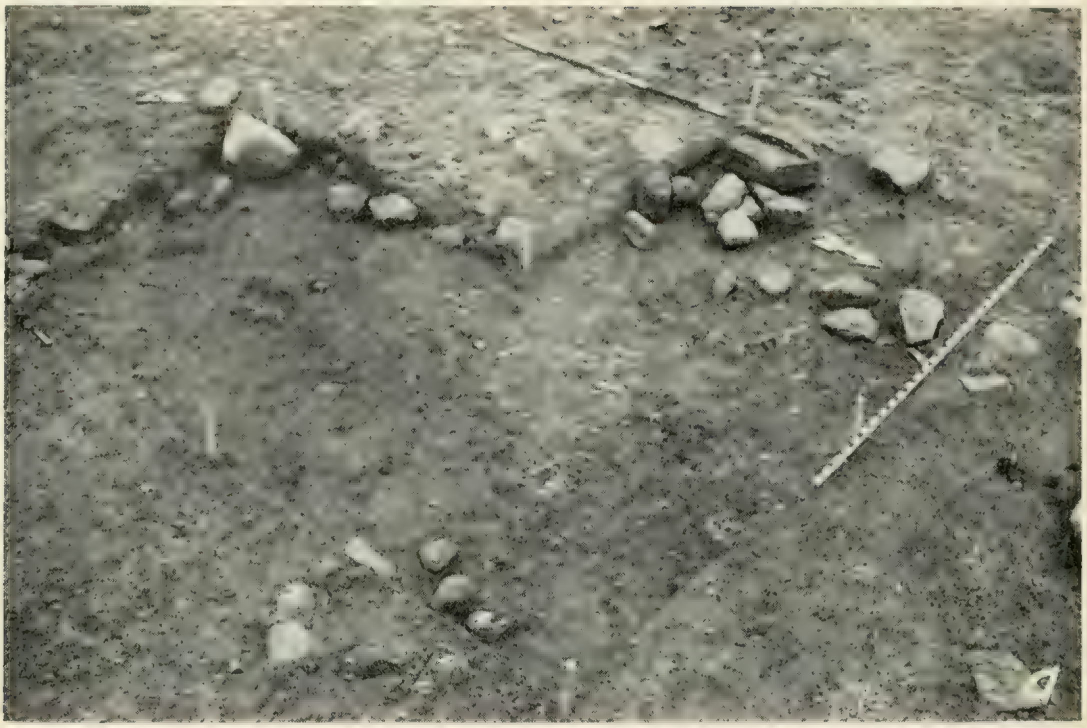
a, Looking down from the south edge of Milk River Ridge, site 24GL486 in exact center of photograph. *b*, Site 24GL487, ring 1 (Milk River Ridge in background).

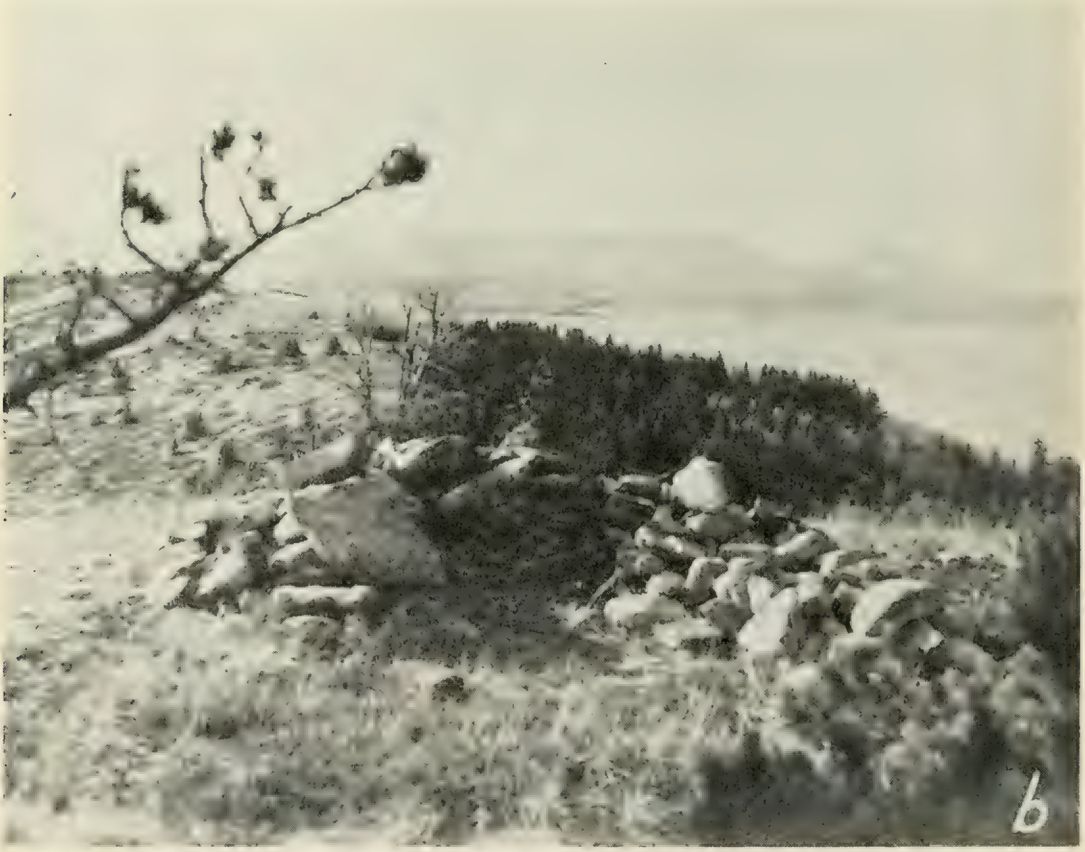


a, Detailed view of section of the stone circle, site 24GL487, ring 4 (trowel points north). *b*, Site 24GL486, ring 4, one of a cluster of six tipi rings located on the slope of the south side of Milk River Ridge. Ring is 14 feet in diameter and contains a boulder-lined fireplace.

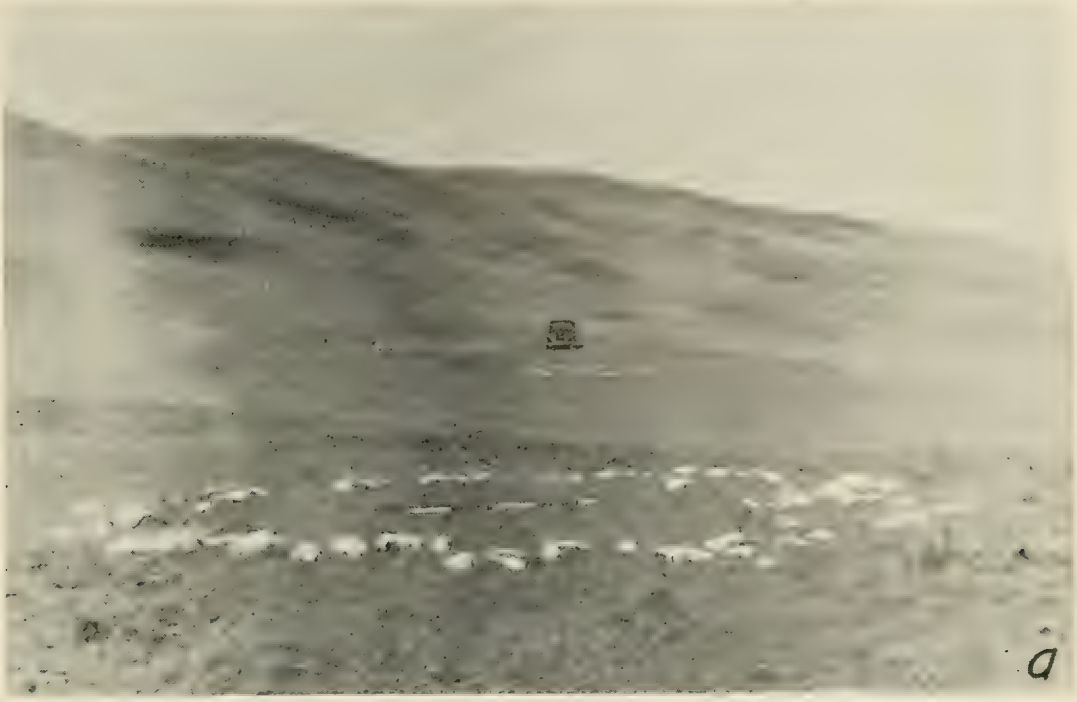


a, Rock ring fire hearth, site 24GL486, ring 4. Square 2L1 (right) excavated to hard gray layer, 0.1 foot below surface. *b*, Section of the stone circle, ring 4, site 24GL486, square 2L2; rock ring fire hearth in square 2L1 (see *a*).

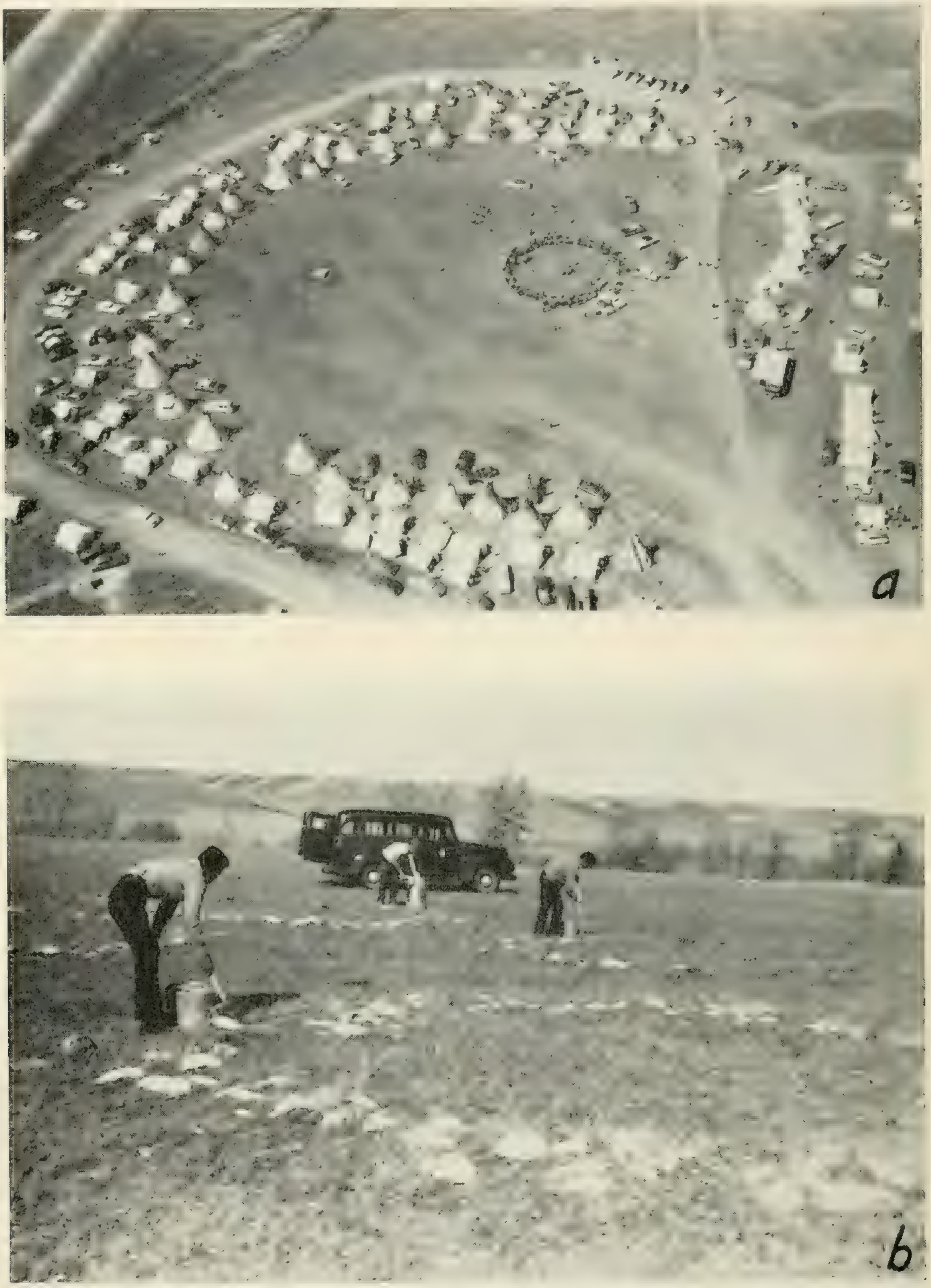




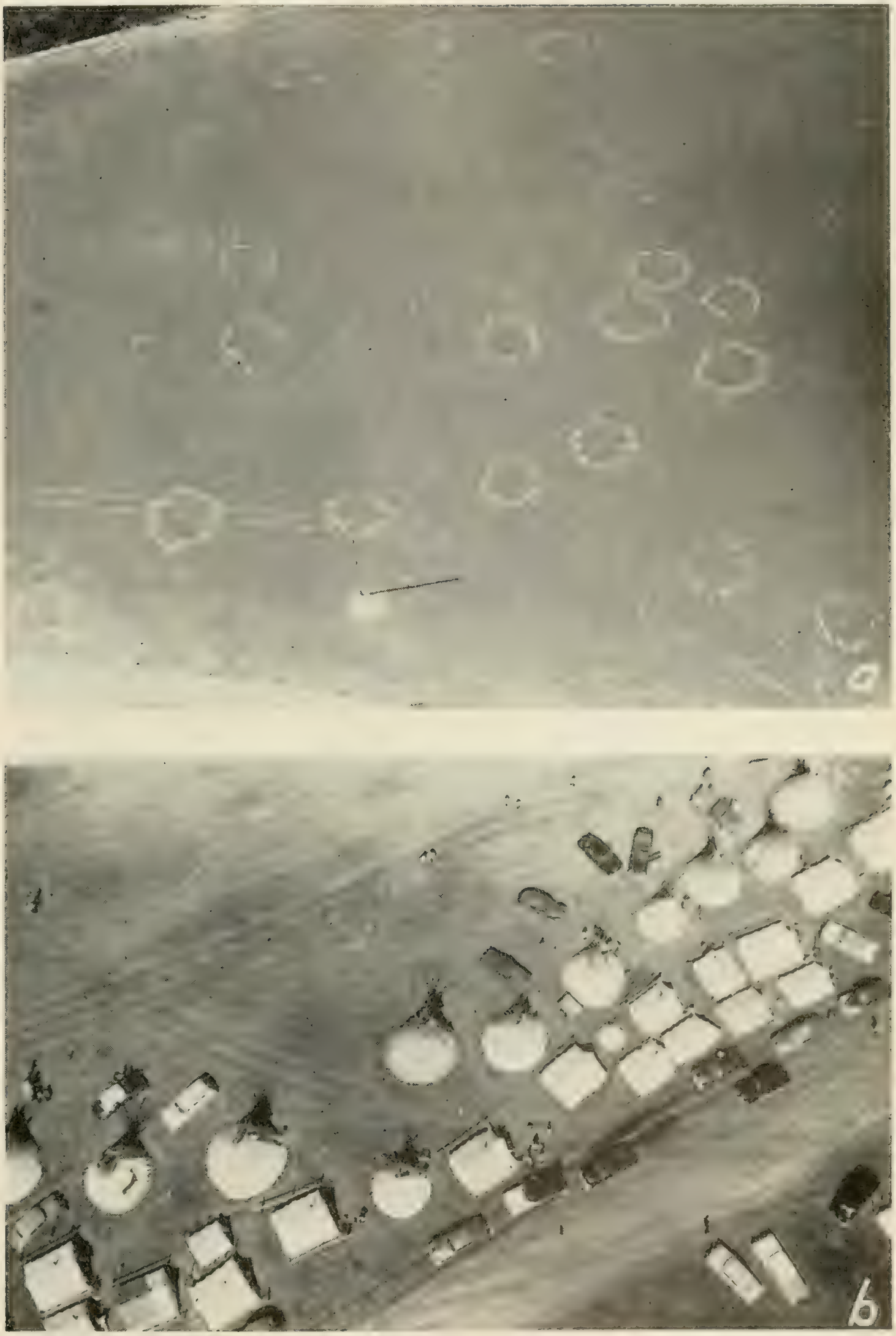
a, Site 24GL486, ring 4. Rocks in square 1L1 (upper left) displaced by blowout; square 1L2, unexcavated, shows rocks embedded in ground between excavated squares 1L1 and 2L2; rock ring hearth in foreground. *b*, Fasting shelter of Ear Rings, Earrings Hill, southeast of Starr School on the Blackfeet Indian Reservation. (Photograph taken October 1950; courtesy Claude E. Schaeffer.)



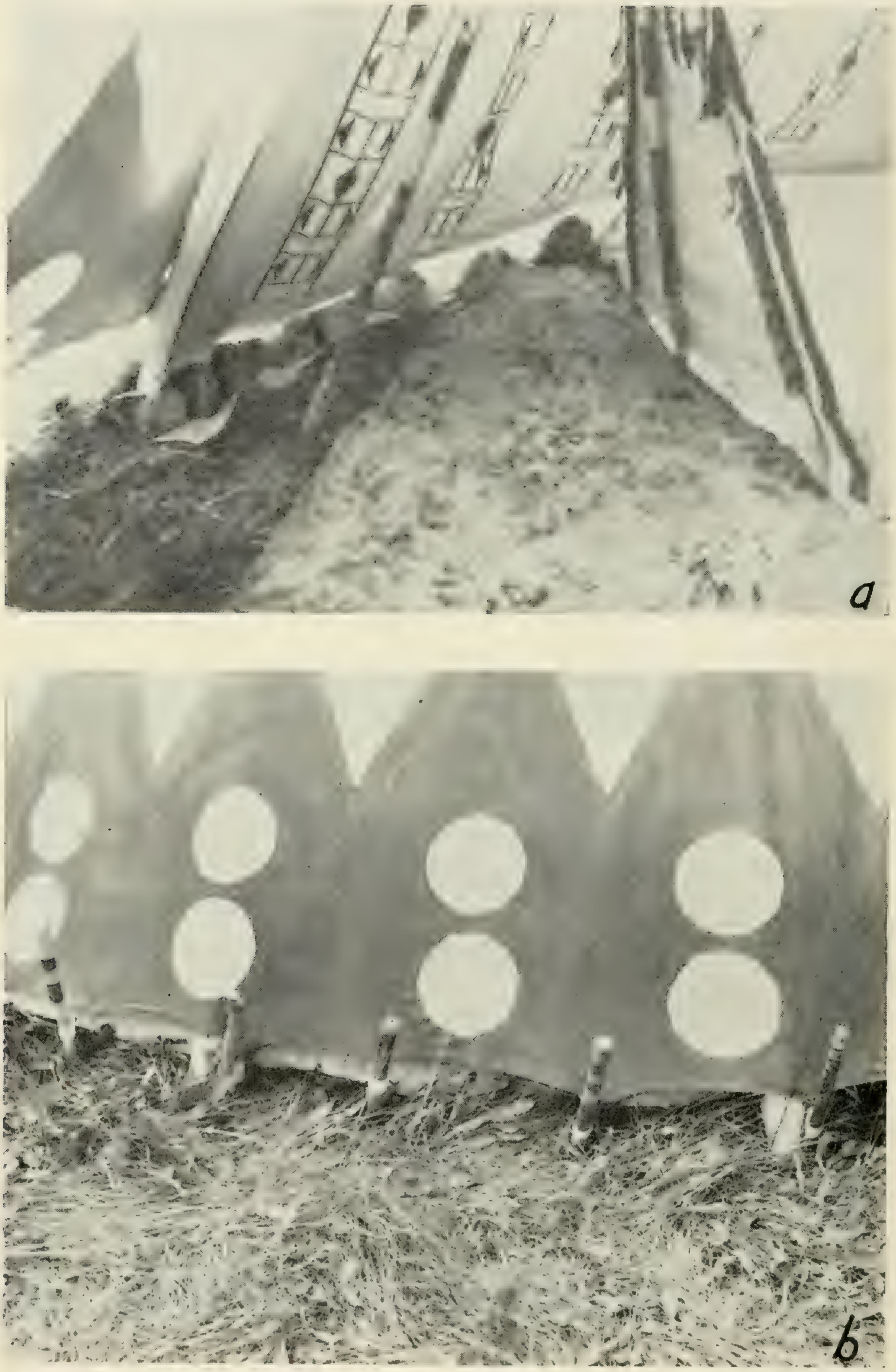
a, Site 24GL520, tipi rings associated with a buffalo drive site on the south side of Milk River Ridge. (See pl. 49, *a*.) Fragmented bones were found in abundance in the hill slope beyond the jeep. Rock pile drive lanes extend from the drop-off along the crest of the Ridge (not visible in photograph). *b*, Blackfoot woman repairing Lodge 26 at the 1956 Blackfoot encampment, Browning, Mont.



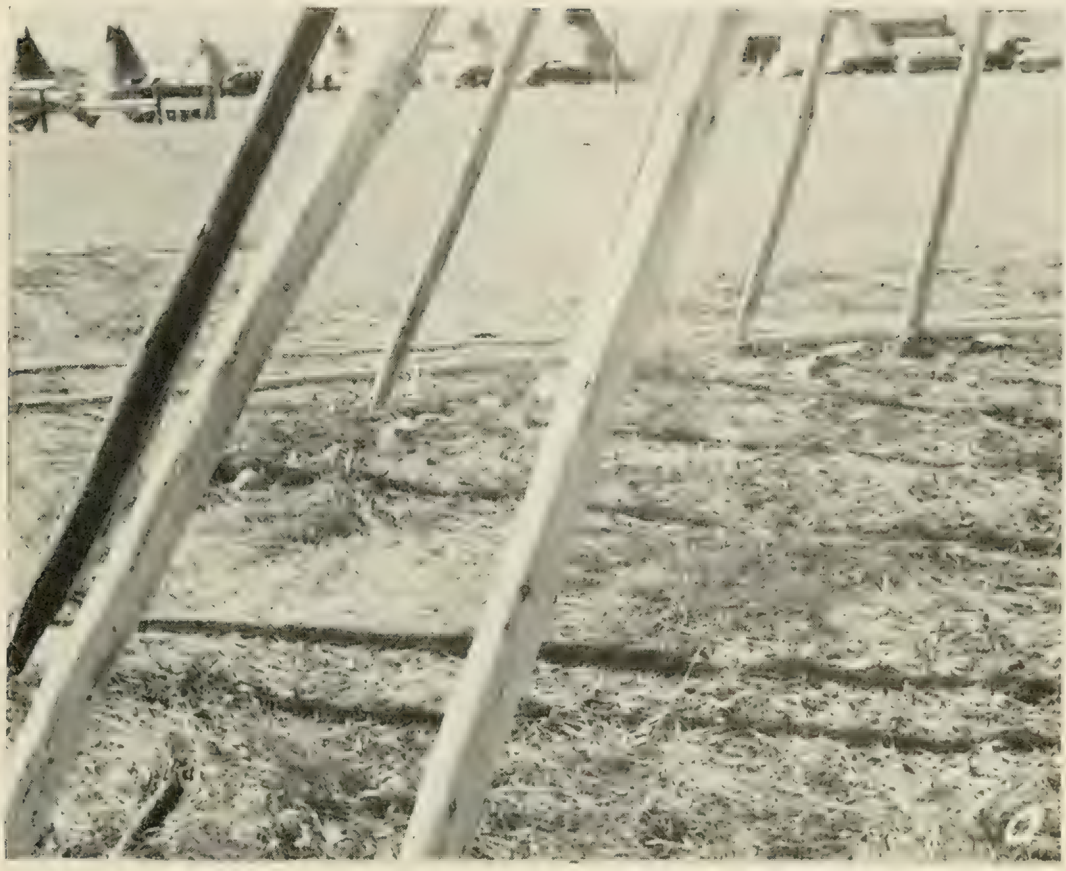
a, Oblique aerial view from the southeast of the 1956 Blackfoot encampment, Browning, Mont. *b*, Whitewashing tipi rings preparatory to photographing, site 24GL350.

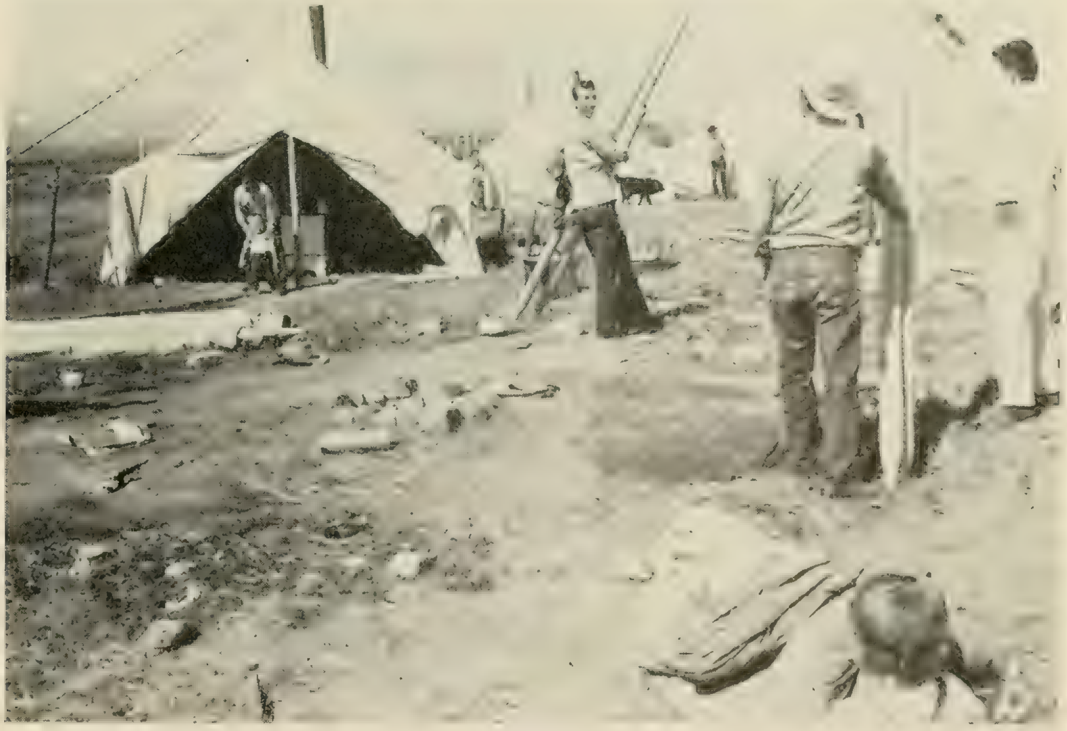


a, Aerial view of site 24GL350. Note similarity of tipi-ring pattern to arrangement of 1956 encampment lodges (below). *b*, Horizontal aerial view of the south row of tipis (Nos. 2 to 12 and 39), 1956 Blackfoot encampment, Browning, Mont. Note small play tipi below larger lodge, right center.

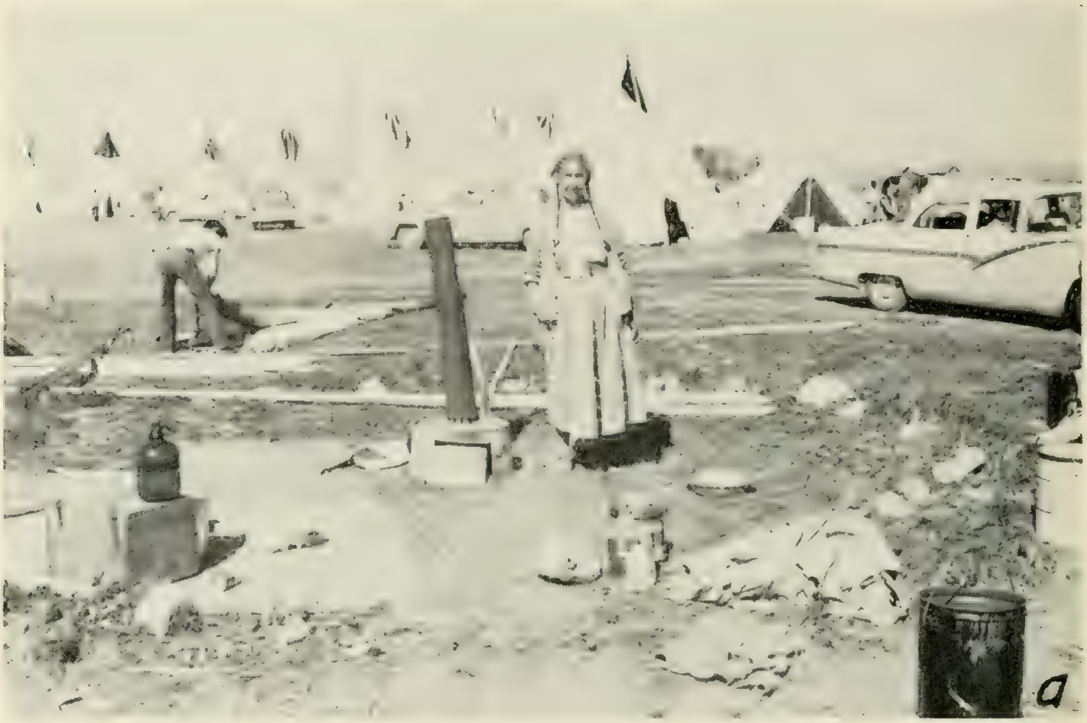


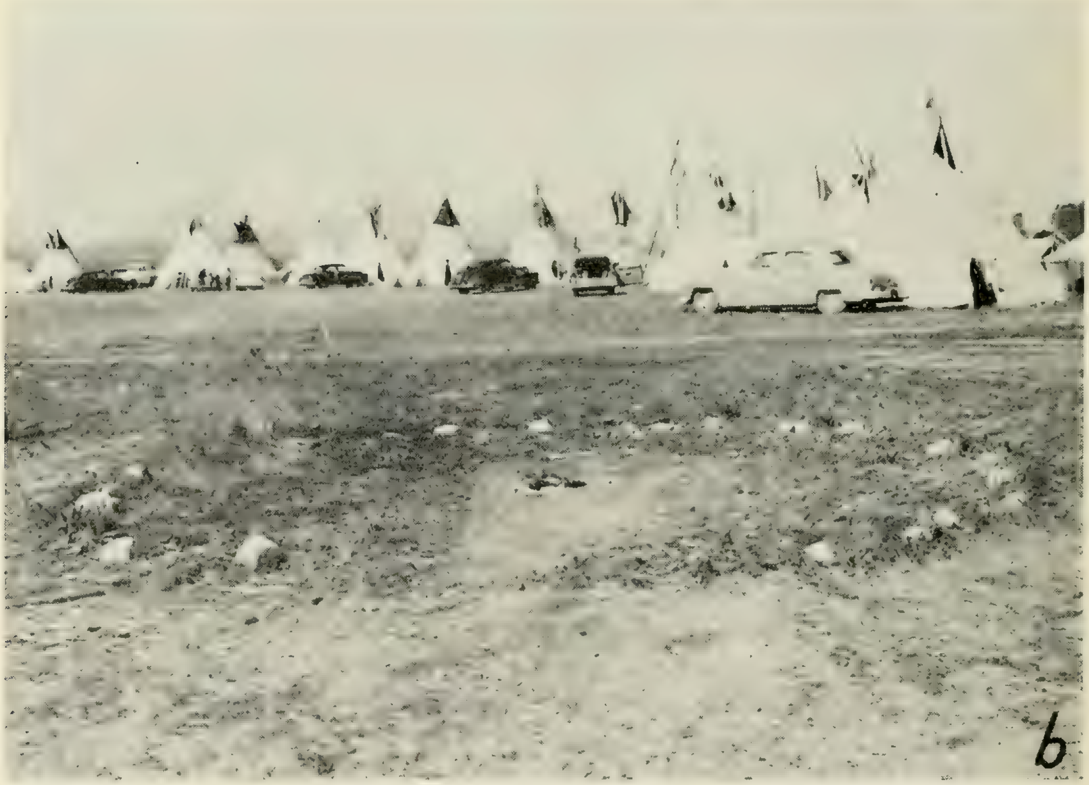
a, Rocks holding down inner lining, Lodge 26 (owned by Mae Williamson), 1956 Blackfoot encampment, Browning, Mont. *b*, View from outside Lodge 26, showing rocks pushing out inner lining (see *a*).



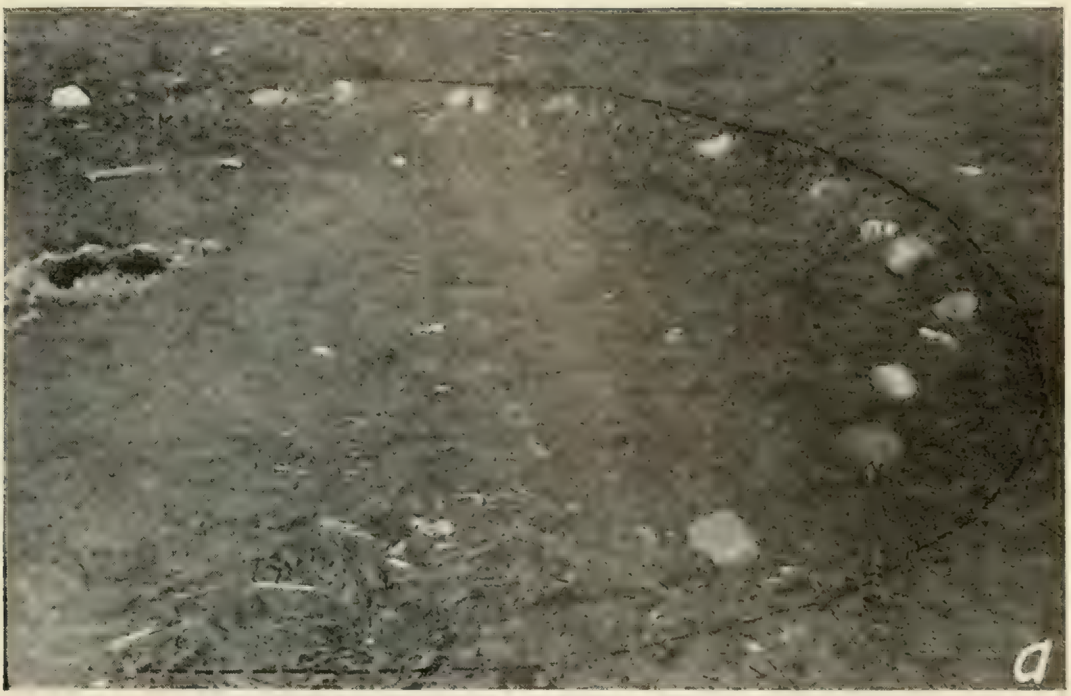


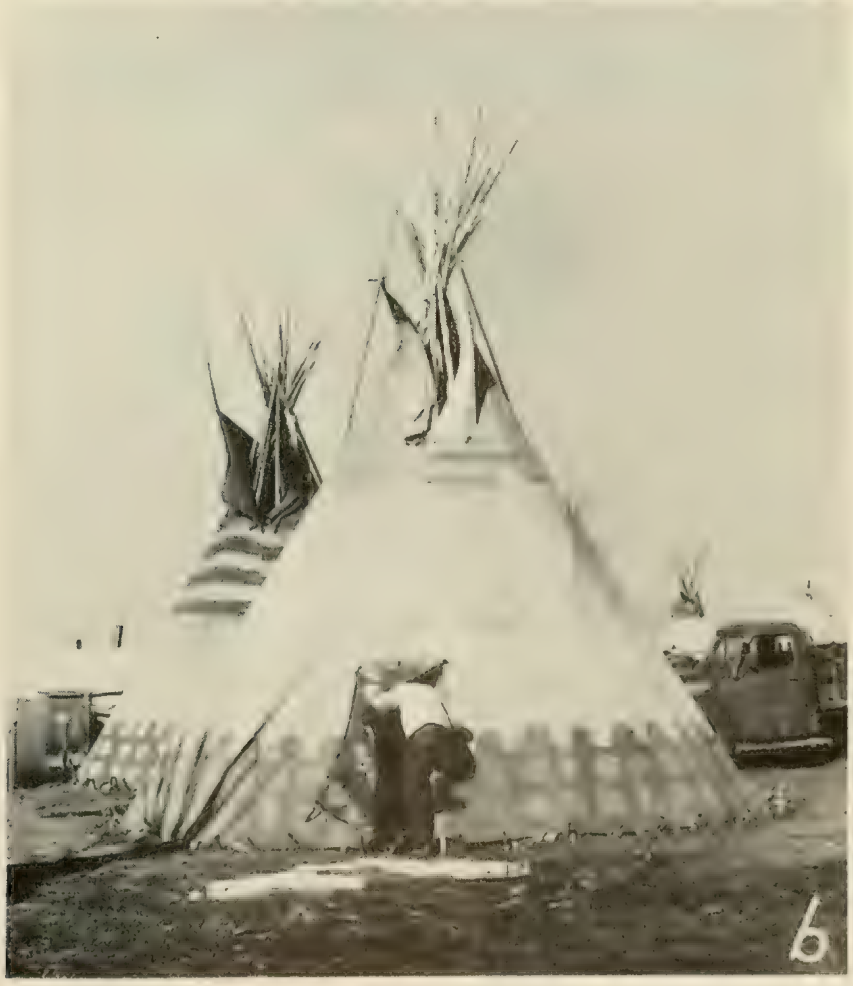
a, Rocks forming a tipi ring after removal of inner lining and tipi cover of Lodge 26, 1956 Blackfoot encampment, Browning, Mont. (tipi poles still standing in place). *b*, Removal of the poles of Lodge 14, showing rock-lined fire hearth and tipi ring remaining.



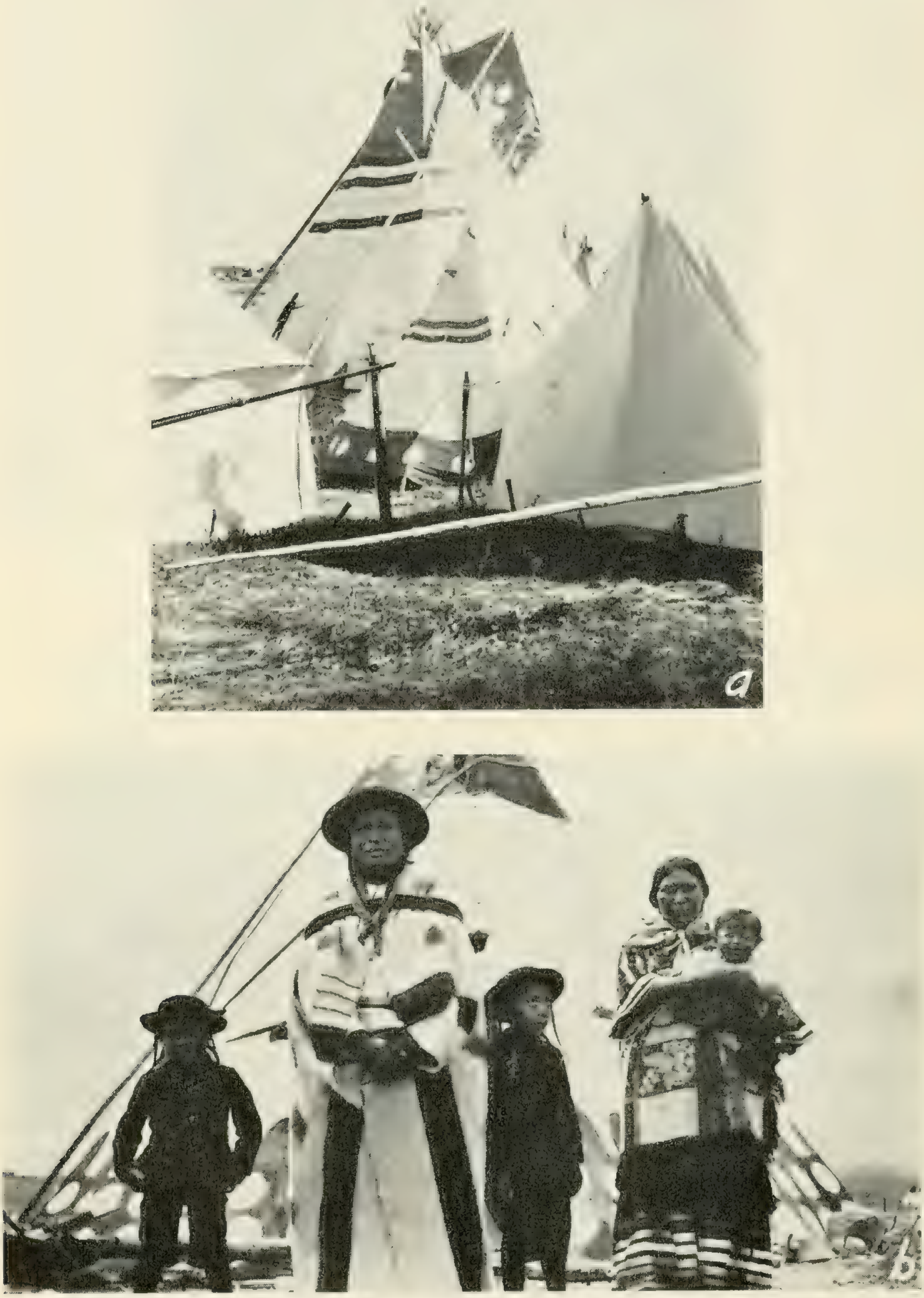


a, Mary Ground in the center of the tipi ring left after removal of her tipi, Lodge 30, in breaking camp, 1956 Blackfoot encampment, Browning, Mont. *b*, Mary Ground's tipi ring and unlined fire hearth after her departure (see *a*).





a, Closeup view of Mary Ground's tipi ring, site of Lodge 30, 1956 Blackfoot encampment, Browning, Mont. Dotted line indicates former position of tipi pegs (i. e., edge of lodge cover). Note lack of packing of grass along edge of ring. *b*, Blackfoot man using 2-foot-wide doorway of Lodge 2, 1956 encampment.



a, Children's play tipi, Lodge 39, next to Lodge 6, 1956 Blackfoot encampment, Browning, Mont. *b*, Tom Horn's family in front of their tipi, Blackfoot Reservation, 1910. (Note rock weights.)

INDEX

Abraders, 197
  sandstone, 159, 171–172, 178, 186, 194, 197, 215, 220, 246, 248
Adams, John, 222
Adam White Man, Blackfoot informant, 429, 430–431, 432, 433, 434, 446
Adornment, 250–251
Adz, bone, 199
Agate, 193
  moss, 446
Agriculture, 245, 251
Airas, native informer, 289, 290, 291, 292, 293
Akron, Washington County, Colo., 229
Albany County, Wyo., 236
Albemarle County, Va., 65, 82
Alden, William C., 438
Alexander, Mr.—, owner of RM–1, 36
Allegheny Mountains, Highland County, 10–11
Alma, Harlan County, Nebr., 146
Alówanpi ceremony, Dakota Indians, 351, 353, 354, 357, 369, 379
American flag, shown in Indian winter counts, 351
American Horse, Oglala Indian, 346, 350, 352, 354, 358, 360, 361, 362, 365, 366, 373, 379, 383, 388, 390
American Horse count, Oglala band, 346
Anderson, J. A., 347
Angaur, Palau group, 295
Angostura Reservoir area, S. Dak., 139, 237
Anguispira alternata, 32
Annie Calf Looking, Blackfoot informant, 429, 430, 433, 434
Antelope, 143, 204, 216
Antlers, worked, 174–175, 179, 215, 221, 245, 246
Apache Indians, 240
Arago, J., 286
Arapaho Indians, 361
Archeology, Northwest Virginia, relationship to archeology of Eastern United States, 80–89
Archithinue natives, 460
Argillite, maroon, 445
Arikara Indians, 340, 347, 348, 350, 354, 355, 356, 360, 365, 368, 373
Arickaree River, 231
Armbands, bone, 198, 202–203
Arrowheads, black flint, 21, 458
  quartzite, 65
  stone, 426
Arrow points, bone, 246
Arrows, 380, 381, 398
Arrow-shaft polisher, 206, 215, 241, 244
Arrow-shaft wrenches, 241
Artifacts, bone, 173 (table), 179, 198 (table), 204, 212, 238
  chipped-stone, 66, 81, 83, 178, 197, 238, 245, 248
  contents of tipi rings, 470
  glass, 238
  horn, 238
  metal, 155, 238
  shell, 242
  stone, 30, 31, 32, 34, 35, 36, 37, 38, 40, 41, 67 (table), 155 (list), 158, 181, 182, 238
  Houses I and II, 149 (list)
  House III, 150 (list)
  House IV, 151 (list)
  House VI, 155 (list)
  miscellaneous, 53–58, 213
  Plains type, 241, 252
  stone, 212
Arundo donax, 267
Ash Hollow Cave (Site 25GD2), 141, 184, 189, 191, 216, 223–224, 236, 237, 247, 255, 384
Ashley, William, Dakota Indian, 341
Ash trees, 145, 177
Aspen trees, 438
Assiniboin Indians, 347, 348, 354, 355, 376, 377, 387, 424, 426
Athabascans, 240, 245, 251, 252
Athapaskan bands, 440
Atlatl, description of, 267–268
  use of, on Lake Patzcuaro, Michoacan, 261–268
Atlatl weight, 17
Augusta County sites, 12, 13 (map), 15–31, 74
  AU–1 (quartzite-using station), 12, 15, 76, 77 (chart)
  AU–2 (Buffalo Gap), 12, 15–16, 63, 77 (chart), 85, 86
  AU–3 (rock mound), 13 (map), 16
  AU–3A (preceramic site), 13 (map), 16
  AU–4 (preceramic, chert-using period), 16–17, 49, 57 (table), 66, 67 (table), 68, 77 (chart)
  AU–5 (near Staunton, Va.), 17, 30, 49, 57 (table), 61, 67 (table), 77 (chart)
  AU–6 (rock shelter), 17
  AU–7 (Quick's Mill), 17
  AU–8 (near Waynesboro, Augusta County), 17, 57 (table), 77 (chart)
  AU–9 (near Waynesboro), 8, 17–18, 50, 77 (chart)

Augusta County sites—Continued
  AU–10 (on Calfpasture River), 18, 68, 77 (chart)
  AU–11 (north of Waynesboro), 18–19, 49, 57 (table), 61, 64, 66, 67 (table), 68, 69, 74, 77 (chart), 84
  AU–12 (east of Dooms, Jarmen's Gap), 19, 77 (chart)
  AU–13 (near Waynesboro), 19, 49, 57 (table), 61, 64, 67 (table), 68, 69, 74, 77 (chart), 84
  AU–14 (Dooms, Va.), 19, 57 (table) 77 (chart)
  AU–15 (north of Dooms), 19–20, 57 (table), 77 (chart)
  AU–16 (north of Harrison), 20, 50, 57 (table), 77 (chart)
  AU–17 (quartzite-using station), 20, 24, 50, 57 (table) 69, 77 (chart)
  AU–18 (near Crimora), 20, 57 (table), 77 (chart)
  AU–19 (Staunton, Va.), 21
  AU–20 (Lewis Creek Mound), 7, 21–22
  AU–21 (on Middle River), 22, 57 (table), 61, 64, 75, 77 (chart)
  AU–22 (on Middle River), 22, 57 (table)
  AU–23 (near Lofton), 22–23, 28, 50, 57 (table), 77 (chart)
  AU–24 (near Lipscomb), 23, 50, 57 (table), 67 (table), 77 (chart)
  AU–25 (southwest of Waynesboro), 23, 50, 57 (table), 77 (chart)
  AU–26 (near Lipscomb), 20, 23–24, 57 (table), 61, 68, 69, 74, 77 (chart), 78, 84
  AU–27 (rock shelter), 8, 24, 77 (chart)
  AU–28 (SE of AU–27), 8, 24
  AU–29 (Seidling Hill), 24–25 (table), 49, 77 (chart)
  AU–30(Natural Chimneys), 25–26, 52
  AU–31 (southeast of Laurel Hill), 26, 49, 57 (table), 61, 77 (chart), 78
  AU–32 (near Stuart's Draft), 26, 57 (table), 77 (chart)
  AU–33 (near Stuart's Draft), 26–27, 57 (table)
  AU–34 (south of Stuart's Draft), 27, 57 (table), 61
  AU–35 (on Middle River), 27, 41, 57 (table), 77 (chart)
  AU–35–M (East Mound), 7, 12, 13 (map), 27, 57, 85
  AU–35–V–1 (village site), 12, 13 (map), 27, 52, 57 (table), 61, 64, 77 (chart)
  AU–35–V–2 (village site), 12, 13 (map), 27–28, 61, 62, 77 (chart)
  AU–36 (northwest of Staunton), 28, 49, 57 (table), 67 (table), 68, 77 (chart)
Augusta County sites—Continued
  AU–37 (Deerfield Valley), 28, 68, 77 (chart)
  AU–38 (east of Lofton), 28, 52, 57 (table)
  AU–39 (near Lofton), 28–29
  AU–40 (northeast of Vesuvius), 29, 50, 57 (table), 77 (chart)
  AU–41 (left bank McKittrick Creek), 29, 49, 57 (table), 77 (chart)
  AU–42 (on Calfpasture River), 29, 77 (chart)
  AU–43 (northeast of Verona), 29–30, 57 (table), 77 (chart)
  AU–44 (on Middle River), 30, 57 (table), 61, 75, 77 (chart)
  AU–45 (on Middle River), 8, 30, 49, 57 (table), 61, 64, 67 (table), 77 (chart)
  AU–46 (on Middle River), 30–31, 57 (table), 77 (chart), 78
  AU–47 (opposite AU–46), 31, 68
  AU–48 (slope of Bell's Creek Valley), 31, 68, 77 (chart)
  AU–49 (northwest of Laurel Hill), 31
Awls, bone, 149, 159, 173, 179, 186, 198, 200–202, 205, 207, 215, 220, 222, 241, 244, 245, 246
  flat, 215, 220
  iron, 215, 251
  spatula, 242
  splinter, 215
Ax, 19, 21, 22, 23, 24, 25, 27, 29, 36, 38, 39, 40, 67
  crude, 53, 54 (fig.), 57 (table), 58, 81, 84, 90–127 (tables)
  crude limestone, 30
  grooved, 21
  polished and grooved, 17
  trade, 154, 155, 175, 179, 250, 426, 430, 435
Aztecs, atlatl used by, 266, 267

BA (Bath County), 12, 13 (map), 31–32
  BA–1 (rock shelter near Millboro Springs), 31–32, 63, 77 (chart), 78
Back Creek, south of Waynesboro, 15, 23, 76
Bad Bird, Indian brave, 394
Badger, 204
Baez, Peter H., 421
Baker Site (Site 25CH14), 217, 255
Bald Knob, Augusta County, Va., 29
Bamun ideographic script, 273
B and M Site (3 miles northeast of Hudson), 232
Banner County, Nebr., 223, 236
Barrow, John R., 427
Bath County (BA), 10, 12, 13 (map), 31–32, 74

Battiste Good Count, Teton Dakota band, 346, 348
Battle or Bell Mound No. 1 (RB–7) Rockbridge County, 8, 42, 84
Beads, 173–174, 243, 285
    bone, 150, 159, 173, 179, 186, 200, 205, 206, 220, 241, 248, 250
    conch columella, 25
    copper, 215
    cylindrical, 242
    decorations, 215
    glass, 231
    marginella, 22
    oval, 200
    porcelain, 181, 211
    round, 198
    shell, 21, 22, 42, 242
    trade, 211
    tubular, 173, 198, 200, 224, 241, 244, 250
    turquoise, 215, 243, 250, 251
Beamers, rib, 198
Beams, house, 280
Bear, Indian representation, 371, 372
Bear Butte, in winter counts, 362, 368
Bear Claw ("Tree Top" (Jack)), 412
Bear-Crane, Crow Indian, 428
Bear Heart, Indian brave, 383
Beaver (*Castor canadensis*), 32, 177, 204, 245
    bone, unworked, 158, 159, 179, 216
    represented in winter counts, 352
Beaver Creek, Scott County, Kans., 237
Beaver Dam, represented by Indians, 352
Beaver Shield, Indian brave, 407
Beckwith, Martha Warren, 371, 378
Beede, Rev. A. McGaffey, 342, 343, 347, 351, 353, 361, 362, 370, 398, 402, 403, 405, 407, 408
Bell, John M., owner of RB–7; 42
Bell, Richard, Jr., information from, 16
Bell's Creek Valley, near Staunton, Va., 31
Bent Horn, Indian brave, 411
Berry Woman, Piegan woman, 432
Bibliography, 258–260
Big Bear, Indian brave, 395
Big Head, Indian warrior, 388, 405
Big Missouri's winter count, 339, 346, 356, 358, 359, 360, 361, 362, 363, 365, 367, 371, 373
Birds, in winter counts, 362
    32 (list), 34 (list)
Birdwood Creek, 16 miles northwest of Hershey, Nebr., 211
Bison (*Bison bison*), 143, 159, 177, 179, 180, 204, 244, 245
Bison drives, Indian hunting method, 438, 446
Black Bear, Indian brave, 407
Black Crow, Indian brave, 401
Blackfeet Arts and Crafts Association, 439, 466
Blackfeet Indian Reservation, north-central Montana, 437, 438, 439, 441, 442, 443, 445, 455, 456, 457, 459, 460, 461, 462, 463, 467, 468, 469
    environmental factors, 437–439
    ethnological background, 439–440
Blackfoot Agency Headquarters, Browning, Mont., 437
Blackfoot Camp, Modern, 464–470
Blackfoot Indians, 350, 355, 365, 372, 424, 426, 427, 428, 435, 436, 440, 444, 457, 459, 460, 461, 463, 467, 468
    camp plans, 442–443, 464, 465 (fig.), 466 (fig.), 467–468, 469 (table), 470 (tables)
Blackfoot informants, 429–436
"Blackfoot Peneplain," pre-Pleistocene, 438
Black Hills, S.Dak., 143, 359, 368
Black Hills Treaty, 396
Black Moon, Indian brave, 402
Black Shield, *see* Beaver Shield.
Black Thunder's count, 352
Blades, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 29, 30, 36, 37, 38, 39, 40, 41, 51
    greenstone, 75
    large, types, 45 (figs.), 48, 53, 81, 90–127 (tables)
    Large Triangular, Type T, 42
Blankets, use of, 428
Bliss, Theodora Crosby, 289
Bliss, Wesley L., 441, 442
Block A–1, 76, 77 (chart), 78, 79
Block A–2, 77 (chart)
Block A–3, 77 (chart)
Block A–4, 77 (chart)
Block B–1, 77 (chart)
Block B–2, 77 (chart)
Block B–3, 77 (chart)
Block B–4, 77 (chart)
Block C–1, 77 (chart)
Block C–2, 77 (chart)
Block C–3, 77 (chart)
Block C–4, 77 (chart)
Block D–1, 77 (chart)
Block D–2, 77 (chart)
Block D–3, 77 (chart)
Block D–4, 76, 77 (chart)
Blood Indians, 426, 460
Bloomington, Franklin County, Nebr., 221
Blue Ridge Mountains, Va., 10, 11, 12, 58, 74, 81
Blue Thunder group, winter counts, 341, 342, 343, 348–413
Blue Thunder Variant I, 341, 342, 343, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410

Blue Thunder Variant II, 341, 342–343, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410
Blue Thunder Variant III (Yellow Lodge Count), 340, 341, 343, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414
Board, wooden, writing on, 282, 293, 295
Bone, burned, 154, 158, 159, 213, 217, 446
  unworked, 149, 150, 151, 155, 158, 159, 172, 179, 182, 183, 205
  worked, 149, 150, 151, 158, 172–174, 179, 183, 198–204, 205, 206–207, 214, 217, 220–221, 245
Bones, animal fragments, 24, 25, 32 (list), 33 (list), 159, 183, 238
  bird, 32 (list), 34 (list), 204, 241
  bison, 438
    long bones, 249
    unworked, 158, 159, 188, 222
    worked, 159, 174, 186, 198–199, 216
  buffalo, 215
  deer, rodent-gnawed, 25
  deer, unworked, 158, 159, 179, 204, 216
  fish, 177, 205, 216, 245, 251, 268
  horse, 205, 216
  human, fragments of, 21, 41, 42
  mammal, 241
  turtle, unworked, 158, 159, 177, 179, 216
Boulder, Colo., 232
Boulder County, Colo., 231
Boulder Site (9 miles east of Boulder), 232, 256
Bow, carried by Indians, 383, 384, 392
Bow and arrow, 265, 266, 373, 383, 386
Bowl, orifice, 191
  wooden, 276
Box, wooden, 278
Boxelder trees, 145
Boysen Reservoir, Wyo., 441
Bradley, James H., 460, 461, 462
Bradshaw, Mrs. Bessie, owner of Clover Creek Mound, 36
Brady, Verl P., 421
Brass, sheet, 155, 176
Brave Bear, killed, 383, 384
Breastworks, legendary, 182
Breechcloth, worn by Indians, 368
Bridle, horse, 358
Brings-down-the-Sun, Blackfoot ceremonialist, 427, 428
Broad Draft, Augusta County, Va., 28
Brocket, Alberta, Canada, 429
Broken Bow, Nebr., 177
Broken Head, Indian chief, 398
Brown, J. Macmillan, 273, 274, 275, 276, 282, 283, 293, 298, 299, 300
Brown, Prof. W. R., information from, 21–22
Browning, Mont., 429
Brownlee, Jerry, information from, 19
Brownlee, on North Loup River, 208
Brownsburg, Va., 40
Brush Creek, 222
Buffalo, white, represented on winter counts, 374, 386
Buffalo Bull, chief's son, 362
Buffalo-bull-standing, Indian brave, 412
Buffalo chips, used for fuel, 427, 457
Buffalo drives, Indian hunting method, 457, 460
Buffalo drive sites, 457, 460, 461 (fig.)
Buffalo Fool, Indian brave, 409
Buffalo Gap, George Washington National Forest, 15
Buffalo Ghost, Indian brave, 407
Buffalo Head, Indian chief, 378
Buffalo horn, ceremonial use of, 366
Buffalo kills, 443
Buffalo Pound Hill Lake, near Moose Jaws Forks, 425
Buffaloes, 357, 361, 366, 376, 377
  skins, used for tipi covers, 460
  traps, 429, 433
Buick, Elbert County, Colo., 230
Bull Canyon Site (Site 25BN2), 222–223, 236
Bull Head, Blackfoot informant, 429, 432, 433, 434
  See also Hat.
Bullpasture River, Highland County, Va., 10, 35
Burdick, Eugene, 343, 344
Burdick, Usher L., 345, 351, 374
Bureau of American Ethnology, 225
Bureau of Indian Affairs, 421
Burial mounds, 78, 85
Burials, 42, 178, 216
  flexed, 27, 85
Burnsville Highway, Highland County, Va., 35
Burrows, Edwin G., and Spiro, Melford E., 289, 294, 307
Bush Count, Dakota Indians, 346, 352, 353, 354, 355, 356, 358, 359, 360, 362, 363, 364, 366, 368, 370, 371, 377, 382, 383, 384, 386, 392
Bushnell, David I., Jr., 425, 445, 460
Butts, Charles, information from, 11, 71
Byers Site (10 miles north of Byers, Colo.), 232, 256

Cactus, 143
Calamus River, 143

Calfpasture River, Augusta County, 10, 11, 16, 18, 25, 28, 41, 42, 75
Caliche, white chalky material, 167, 172, 245, 246, 250
Callar, Charles, collections by, 24, 25 (table)
Calumet, peace pipe, 362
Calvin Boy, Blackfoot informant, 429
Campbell, W. S., 437
Camp Circle, 433, 462, 464
Camp May Flather, Girl Scout Camp, 24
Camp plans, Blackfoot Indians, 442 (table), 443
Caña brava, native name for native cane, 267
Cane (*Gynerium sagittatum*), 267
Canis sp., 177, 179, 216
Cannibalism, practice of, 367
Cannon Ball River, 379, 381
Canoe-house beams, 279
Canoes, 266, 274, 276, 278, 285, 289, 351, 364
  outrigger, 285
  outrigger platform, 296
  sailing, 288
Çans, metal, used as stoves, 467
Čanté T'inza (Strongheart), warrior society, 357, 412
Canyon Ferry Reservoir, Missouri River, Helena, Mont., 441
Capote, white, worn by Dakota scouts, 355, 383, 384, 387, 391
Captive Butte, 385
Carbon, in fireplaces, 188
Carnivora, bones of, 32
Caroline Islands script, 269–333
  affiliations, 287
  analysis of the writing, 299–307
  comparison of native texts, 307–309 (fig.), 310 (fig.)
  effect of dialects, 304–305
  final consonants, 305–307
  informants on, 282 (list)
  lack of correspondence of characters and syllables, 303–304
  length of vowel, 300, 301 (list), 302
  list of inventors, Type 1, 295
  number and sequence of characters, 282
  origin of the writing, 282–299
  present-day knowledge and distribution of, 279–280, 281 (map)
  summary, 309–311
  syllabic values, 283
  tables, 313–333
  Type 1, 273–276, 277, 279, 283, 291, 293, 297 (list of characters), 298 (list), 300, 310
  Type 1, date of invention, 297
  Type 1, derivation of characters, 297–299
  Type 1, foreign influence, 296–297
  Type 1, history, 294–296
  Type 1, invention at Faraulep, 295–296
Caroline Islands script—Continued
  Type 2, 277–278, 279, 283, 286, 288, 289, 290, 291, 292, 293, 294, 298, 300, 310
  Type 2, history reconstructed, 284–294
  Type 2, similarity to the roman alphabet, 283
  Type 2, spread of, 293–294
  vowel characters, 302–303
Carries Braid, Blackfoot Indian, 430
Carroll, Lt. Kevin, information from, 280
Carry - His - Lodge - on - Back, Indian brave, 404
Castor canadensis, 32, 177
Catlinite, 167, 172, 215, 246
Cecile Black Boy, Blackfoot informant, 429, 430, 434
Cecile White Man, Indian woman, 430
Celts, 16, 17, 19, 21, 22, 23, 25, 26, 27, 29, 30, 37, 67, 84
  crude, 53, 54 (fig.), 57 (table), 90–127 (table)
  greenstone, 17, 42, 53, 54 (figs.)
  pecked or polished, 53, 54 (fig.), 57 (table), 58, 90–127 (tables)
Ceramic area, Allegheny, 58, 61, 63, 64, 83, 85
  Central and North Central, 61, 64, 72 (map), 83, 84
  Stony Creek, 65, 71, 72 (map)
Ceramic complex, 29, 35, 38, 57 (table), 58, 68, 69, 70 (map), 76, 78, 81, 87, 88
Chalcedony, 66, 167, 181, 182, 185, 187, 193, 196, 206, 219, 225, 228, 229, 246
  Bad Lands, 193, 195, 196
Chalk, silicified, 195, 220
Champe, John L., 139, 142, 143, 145, 176, 224, 238
Charcoal, 33, 36, 152, 154, 158, 159, 177, 188, 204, 213, 216, 217, 221, 224, 250, 449, 457
  layer, 32, 152, 159, 183, 189, 432, 437
Charging Bear, Indian name for Major Welch, 411, 412
Charlie Strikes with Gun, Indian guide, 432
Chaske, Indian trader, 352
Cherry, wild, 204, 205
Cherry County, Nebr., 208
Cherry Creek, 363
Chert, blue, 11, 16
  blue-gray, 11, 35
  gray, 11, 167
Chert rocks (chips), 11, 18, 31, 33, 34, 35, 38, 41, 66, 67 (table), 68, 71, 74, 75, 90–127 (tables)
"Chert-using" stations, designation of, 14, 16, 18, 26, 28, 29, 30, 31, 34, 35, 41, 50, 51, 68, 69, 70 (map), 78, 79, 82, 87

Chewing Black Bones, Blackfoot informant, 429, 433
Cheyenne County, Colo., 234
Cheyenne Indians, 350, 361, 437
Cheyenne River, 350, 368
Cheyenne River Reservation, 346
Chickenpox, 377, 378
  See also Measles; Smallpox.
Chief Joseph, Indian chief, 397
Chief's or Bell Mound No. 2 (RB–7), 42
Chipmunk (*Tamias striatus*), 34
Chipped points, classification chart, 156
"Chippewa," refers to Turtle Mountain bands, 347, 350, 365, 366
Chokecherries, 143, 216, 245
Choppers, 170, 178, 186, 194, 196, 197, 206, 214, 220, 225, 242, 248
Churchville, Va., 12
Claiborne, Mrs. Virginia, director of Valentine Museum, 42
Clay, burned, 205
  pottery, 193
Clement, Basil, interpreter, 346
Cloth, 285
Cloud Fire, white man, 414
Cloud Shield count, Oglala band, Teton Dakota tribe, 346, 352, 358, 362, 363, 364, 366, 373, 385, 388
Clover Creek Mound (HD–9), 7, 36, 85
Cluny, Alberta, 429
Coat, red, in winter counts, 356
Cocking, Matthew, 460
Coconut-leaf midribs, writing on, 295
Coe, Joffre, 82
Cohen, Lucy Cramer, 339, 341, 347, 356, 358, 359, 362, 363, 365, 367, 373
Coked material, 207
Colorado Piedmont, Central Plains area, 143, 144
Comanches, 243, 440
Comet, in winter counts, 409, 410
Conklin, H. C., 296
Cooking hearth, stone, 431 (fig.), 432
Cooper, Paul, 140
Coots, hunting of, 266
Copper, sheet, 176
Copper fragment, 27, 42, 176, 238
Corbett Branch, tributary of Calfpasture River, 16
Cordage, 285
Corn, charred, 32, 204, 216, 217, 222, 238, 245, 250
  dry, 365
Corncobs, 216, 217
Cornhusks, 216, 217
Corral fence, Chippewa, 365
Costilla County, Colo., 235
Costume, Grass dance, 401, 414
Cotton Wood, Yanktonaise chief, 402
Cottonwood Creek, 221
Cottonwood trees, 143, 145, 438
Cougar, represented by Indians, 378
Coup stick, represented, 369, 373, 385, 392, 394
Cowpasture River, Bath County, Va., 10, 31, 35
Coyotes, 143, 159, 177, 250
Crawford, Nebr., 226
Crazy Bear, Indian chief, 398
Crazy Walker, Indian brave, 398
Cree Indians, 388, 424, 428, 432, 436
Crimora, near South River, Va., 20
Cross, Dorothy, 82
Crow Creek, 350
Crow Creek Reservation, 346
Crowfeather, Indian chief, 393
Crowfoot, Chief, 432
Crow Indians, 340, 348, 353, 354, 355, 356, 357, 358, 359, 360, 361, 366, 367, 369, 373, 374, 376, 378, 379 380, 382, 383, 384, 385, 386, 387, 388, 389, 391, 392, 393, 394, 395, 400, 405, 426, 428
Crow King, Indian brave, 400
Crow Reservation, 428
Crows (birds), 363, 364
Cuartelejos tribes, 243
Cumming, Robert, 140
Curtis, Edward S., 339, 341, 346, 352, 353, 354, 356, 360, 361, 362, 363, 364, 368, 370, 371, 382, 387, 389, 390, 392, 401
Curtis, Nebr., 222
Custer, General, 390, 396

Daddy Run, tributary of Calfpasture River, 16
Dakota calendar, *see* Dakota winter counts.
Dakota Indians, 339, 340, 341, 342, 343, 347 (list), 350, 351, 354, 355, 356, 357, 360, 361, 362, 363, 364, 365, 366, 367, 370, 371, 373, 378, 379, 382, 383, 384, 385, 386, 387, 390, 391, 393, 394, 395, 396, 397, 398, 399, 400, 402, 403, 404, 405, 406, 407, 408, 409, 428
Dakota winter counts, description of, 347–414
  introduction, 339–341
  names and authorship, 341–345
  counts used for comparison, 345–347
Dakota Winter Counts as a Source of Plains History, by James H. Howard, 335–416
Damm, H., 274, 275, 276, 277, 278, 282, 283, 288, 289, 293, 294, 300
Damm, H., and Sarfert, E., 274, 277, 278, 283, 284, 294, 299
Damtown, *see* Fort Defiance Mill.
Davidson, Dr. John F., 177
Davis, E. Mott, 140
Dawson, George M., 426
Day, S. Victor, 446
Dead Horse Head Point, Missouri River, location of flood, 366
Deer (*Odocoileus virginianus*), 32, 33, 177
  antlers, unworked, 33, 158
  antler tips, 159

Deerfield, Augusta County, Va., 16, 25, 28
Dempsey, Hugh, 426, 429, 457, 460
Dendrochronology, 177, 179, 204, 216, 221
Denny, Sir Cecil, Indian agent, 426
Densmore, Frances, 344, 345, 351, 352, 353, 382, 383
De Smet, Father, Catholic priest, 391
Dick, Herbert, 140
Dickens, Nebr., 211
Dick Site (25FT9), 222, 255
Different-Kind-of-a-Gun-Woman, wife of Tom Horn, 435
Digging tools, scapula, 173, 174, 179, 186, 198, 204, 241
Diorite, 445
Diringer, David, 275, 282, 283, 296
Dismal River, 143, 180, 181, 182, 222
Dismal River area, 140, 239
Dismal River Aspect, 139, 180, 204, 212, 221, 236, 238, 239, 242, 243, 244, 245
  adornments, 250–251
  definition of, 141, 142, 251
  description of, 245–251
  environmental setting, 143–144
  exchange, 251
  religion and mortuary customs, 251
  review of previous work, 141–143
  sources of information, 255–257 (tables)
  structures, 248–250
  subsistance, 245
  summary and conclusions, 251–252
  technology, 245–248
  tools and implements, 248
Dismal River culture, 238, 241 242
Dismal River people, 143, 144, 145, 179, 180, 239, 240, 244, 245, 246, 252
Dismal River relationships, 238–245
Dismal River sites, 144 (map), 145–180, 194, 230, 238, 241, 253–254 (tables)
Dodd, Howard, 140, 226
Dog Ghost, Indian leader, 365
Dog head, Blackfoot Indian, 429
Dogs, 177, 204, 245, 250
  burden carriers, 424, 428, 429, 430, 434, 435
Don't Laugh Band, Blackfoot Indians, 430, 434
Dooms, in Jarmen's Gap, Shenandoah National Park, 19
Drills, 16, 17, 19, 20, 23, 26, 27, 28, 30, 31, 37, 55 (fig.), 56, 57 (table), 58, 84, 90–127 (tables), 149,151, 168–169, 178, 179, 182, 194–195, 214–215, 238, 242, 246, 252
  cigar-shaped, 168–169, 194–195, 214, 220, 225, 240, 242, 248
  expanded-base, 169, 194, 209, 220, 238, 248
  flint, 159, 246
  straight, 214
Driver, Capt. W. R., information from, 285
Drum dance, shown by Indians, 402
Drybranch, tributary of Jackson River, 33, 34
Duck Chief, Mrs., Blackfoot interpreter, 429, 435
Ducks, 266
Dugouts, 354, 355
Dundy County, Nebr., 217
Duvall, on lodge-cover weights, 428

Eads, Cheyenne County, Colo., 234
Eagle, 204
Eagle Calf, Blackfoot Indian, 431
Eagle catches, 458
Eagle Claw, Indian, 402, 408, 413
  See also Frosted Red Fish.
Eagle Claw, Indian woman, mother of Frosted Red Fish, 408
Eagle Hills, southern Saskatchewan, 440
Eagle Nest, Indian warrior, 385
Eagle trapper, 355, 356
Eagle trapping, ritualized, 356
Earrings, John Bird, son of Ear Rings, 459
Ear Rings, Piegan Indian, 459
Earth, burned, 152–153, 154, 158, 188
Earth, Indian woman, *see* Eagle Claw
East, John, owner of locality AU–35–M, 27
Easter Island writing, 275, 276
East Farm, near Churchville, 12
East Mound (AU–35–M), 7
Eauripik, Eoleai Islands, 273, 279, 280, 284, 287, 288, 289, 290, 291, 292, 293, 294, 304, 309
Edwards, Guy, Park Superintendent, National Park Service, 19
Eggan, Fred R., 462
Egilimar, Caroline Islands chief, 273
Elato, Woleai Islands, 273, 274, 276, 277, 278, 279, 285, 287
Elbert, S. H., 273
Elbert County, Colo., 230
Elderberries, 143
Elk, 204, 215, 216
Elkskin, tanned, tent covers, 427
Elk Spider, Dakota chief, 375
Elkton, southwest of Island Ford, 40
Elk Yells in the Water Bear, Indian woman, 430
Elliptio complanatus, 32, 34
Elmendorf, Dr. William, 421
Elm trees, 145
El Quartelejo, 239
Ender, Nebr., 217
Entrance, eastern, 240
Evans, Clifford, sherds classified by, 8, 15, 21, 23, 24, 36, 43, 47, 58, 61, 63, 83, 84, 85, 86, 87
Ewald, Paul, help from, 340
Ewers, John C., 421, 427, 430, 434, 440, 447, 462, 464
Exchange, 251

Fais Island, Caroline Islands, 284, 287
Falalap Island, Woleai atoll, 279, 289
Falalus, Woleai Islands, 278
Falling stars, Indian representation of, 371
Fall River County, S. Dak., 237
Faraulep Island, Caroline Islands, 273, 274, 275, 276, 277, 278, 279, 280, 282, 284, 285, 287, 293, 295, 296, 297, 304, 310
Fasting shelters, not tipi-ring circles, 459
Faunal remains, 176–177 (table), 179, 204 (table), 216
Feather Hawk, Indian brave, 408
Feathers, blue, used by Indians, 357
Finsch, Otto, 285
Fireplaces, 145, 146, 149, 150, 151, 152, 154, 155, 175, 178, 179, 183, 187, 205, 211, 212, 213, 222, 240, 427, 429, 430, 431 (fig.), 432, 434, 435, 436, 437, 445, 446, 449, 455, 457, 458, 463
Flageolets, 242
Flakers, antler-tine, 248
  bone, 198, 203, 241, 244, 246
Flame, member of Two Kettle band, 345
Flame winter count, 345, 352, 353, 354, 355, 356, 358, 359, 360, 361, 362, 363, 364, 366, 370, 371, 377, 382, 383, 384, 386, 392, 393, 396
Flathead Indians, 423, 440
Fleshers, metatarsus, 173, 174, 179, 198, 199, 215, 241
  toothed metapodial, 244, 245
Fletcher, Alice C., and LaFlesche, Francis, 182
Flint (actually chert), 65, 167
  brown, 196
  gray, 176, 185, 195, 196, 219, 225
  white, 167, 195, 219
Flint chips, 159, 181, 193, 195, 196, 226, 228, 229, 246
Flints, gun, 176
Flood, represented by Indians, 366
Floors, 156–157, 188
Flute, 278, 350
Flying-by, Indian brave, 401
Flying Cloud, Indian brave, 409
Folsom points, 80
Fool Bear, Indian brave, 401
Foolish Woman, a Mandan, winter count, 371, 378
Ford, James A., and Willey, Gordon A., 48, 61
Fort Abraham Lincoln, 395
Fort Belknap, 437
Fort Berthold, 381, 385, 407
Fort Defiance Mill (also called Damtown), 22
Fort Lupton, Weld County, Colo., 229, 232
Fort Macleod, 426
Fort McKenzie, 424, 457
Fort Pierre, 357, 384, 389
Fort Randall, 422
Fort Rice, 377, 389, 390, 394
Fort Union, 424
Fort Yates, 364, 368, 369, 374, 375, 395, 396, 399, 402, 409, 422
Foster, George, 266
Four Horns, Indian chief, 377, 402
Fowke, Gerard, 7, 8, 27, 36, 56, 65, 85
Fowls, rare, 245
Fox, gray (*Urocyon cinereoargenteus*), 34
Fox, prairie, 424
Frankforter, Weldon, 140, 176
Franklin County, Nebr., 221
"French," in count interpretations, refers to métis of Red River regions, 347
Frenchman, Dave, Indian informant, 436
Friedmann, Herbert W., birds identified by, 32, 34
Frog, 204
Frosted Red Fish, Indian brave, 402, 408, 413

Gaferut, Woleai Islands, 273, 285
Gala site, 8
Galbreath, Kenneth, 421
Gall, Indian brave, 390, 391, 398, 404
Garden County, Nebr., 223
Gardner, Fletcher, 296
Gates, Frank, 414
Geographical location of all sites, 13 (map)
George Bull Child, interpreter, 429, 431, 433, 434
George Washington National Forest, Va., 15
Gerard, Charles, 421
Gilbert Islands, 286
Gilmar, Edmund, help from, 273
Girschner, Max, 285
Glacier National Park, location of, 438, 442
Glendo Reservoir, southeastern Wyoming, 441
Glen Elder, Kans., 207, 227
Glen Elder sites, 239
Glenn Site (25SX301), 226
Goggles, Mike, Arapaho Indian, 436
Good, Battiste, Teton Dakota Indian, 346, 349, 358, 360, 361
Good Crow, Indian brave, 411
Good Elk, Indian brave, 401, 406
Goodenough, Dr. Ward, 273, 299
Good winter count, 340, 352, 353, 354, 355, 356, 358, 362, 363, 364, 366, 368, 373, 378, 382, 386, 387, 388, 392
Goose Creek, 354
Gorget, shell, 25
Goshen, Rockbridge County, 11, 25, 41, 42
Gourd rinds, 238, 245
Graham, C. H., information from, 36
Grand River, 369, 376, 393
Granite, 193

Grass bundles, used for warmth, 437
Graver, 23, 29, 38, 55 (fig.), 56, 57 (table), 90–127 (tables), 171, 196, 197, 220, 224, 248
Gray Eagle, Eugene, 414
Greasewood Creek, Blackfoot Reservation, 447
Great Bend people (Pawnee), 238, 240
Great Falls, Montana Weather Bureau, information from, 439
Great Spirit, Indian God, 364
Greenstone, 17, 42, 53, 54 (fig.), 66, 67 (table), 75, 90–127 (tables)
Grey Bear, Indian brave, 406, 407, 410
Grey Earth, Indian chief, 365
Griffin, James B., 81, 86
Grinding stone, 186
Grinnell, George Bird, 427, 434
Groah's Ridge, on South River, 29
Gros Ventre, refers to Hidatsa, 347, 350, 359, 360, 364, 369, 385, 437
Grottoes, Rockingham County, Va., 11, 37, 39
Ground stone, 197–198, 215, 242
Guam, Marianas, 285, 292
Gun, European, 251
Gun flints, 176, 242
Gunnerson, Dolores, 140, 243
Gunnerson, James H., 177, 239, 244
Gunnerson, James H.: An introduction to Plains Apache archeology: The Dismal River Aspect, 141-260
Gunnerson, James H., and Gunnerson, Dolores A., 145, 228
Gynerium sagittatum, 267

Habitation patterns, 74–80
Hackberry trees, 145, 177, 216, 245
Haines, R. W., 140
Hairdress, enemy, 358, 359, 360, 361, 364, 369, 373, 376, 380, 382, 383, 384, 385, 387, 388, 390, 392, 394, 395, 396, 397, 400, 408
Hairdressing, Dakota, 367
Half Body Bear, Indian brave, 409
Hall, dance, 402
Halley's Comet, represented by Indians, 409
Halloway draft, near Calfpasture River, 28
Halsey, Robert, 140, 210
Hamburg Südsee Expedition, 275, 276, 277
Hammer-anvil stone, 27, 30, 31, 55 (fig.), 56, 57, 90 (table), 127 (tables)
Hammerstones, 198, 243, 246
  bell-shaped, 186
Haplotrema concavum, 32
Harlan County, south-central Nebraska, 145, 179
Harlan County Reservoir, south-central Nebraska, 139, 145–180
Harney, General, treaty with, 384
Harper's Ferry, Augusta County, 10
Harrington, J. C., 37
Harrison, north of Waynesboro, 20
Hat, Indian brave, 406, 429, 457
Hatchets, polished, 42
  steel, 426
Hawk Shield, Indian brave, 406
Hayes, R. W., 232
Hayes County, Nebr., 207
Hayes' Creek, Rockbridge County, Va., 41
Hayes' Creek Mound (RB–2), Rockbridge County, Va., 7, 40–41, 56
Haynes, R. W., 232, 233
HD (Highland County), 12, 13 (map), 33–36
  HD–1 (rock shelter on Straight Creek), 33
  HD–2 (northeast of Mustoe), 33, 57 (table), 63, 77 (chart)
  HD–3 (on Dry Branch), 34, 68, 77 (chart)
  HD–4 (intersection of Burnsville-Williamsville-McDowell road), 34–35, 49, 57 (table), 77 (chart)
  HD–5 (south of Burnsville Highway), 35, 68, 77 (chart)
  HD–6 (on Shaw's Fork), 35, 57 (table), 68, 77 (chart)
  HD–7 (town limits of McDowell), 35, 68, 77 (chart)
  HD–8 (left bank Bullpasture River), 35–36
  HD–9 (Clover Creek Mound), 7, 36, 61, 63, 77 (chart), 78, 85
Headbands, 206, 207, 242, 248
Headdress, feather, 357, 394
  Omaha Indians, 340, 348, 351, 355, 364
Hearths, 182, 183, 463, 467, 468, 470 (table)
  fire, inside, 446
  fire, outside, 446, 455
Heart River, 371, 372, 378, 387, 388
He-has-a-red-spear, Indian brave, 404
He-has-a-spotted-horse, Indian brave, 403
Heliodiscus parallelus, 34
Hematite, 154, 155, 167, 172, 176, 194, 198, 215, 246
Hematite paint, 42, 172, 203, 250
Hendry, Anthony, 460
Henry, Bethwel, help from, 273
Hercules constellation, 427
Herriot Site (south branch of Potomac River), 86
Hershey, Nebr., 211
Hewes, Gordon, 440
Hidatsa Indians, 347, 356
Hide tanners, bone, 215, 245
High Bear, Indian chief, 409

- High Dog, author of count, 344, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410
- High Dog group, winter count of, 341, 343–344
- High Hawk, Oglala Indian, interpreter, 346, 352, 353, 354, 355, 356, 360, 361, 362, 363, 367, 368, 370, 371, 373, 382, 386, 387, 390, 392, 401
- High Hawk winter count, 340, 346, 356
- Highland County (HD), 10, 12, 13 (map), 33–36, 74
- High Plains, Central Plains area, 143, 144, 439
- Hilger, Sister M. Inez, 436–437
- Hill, A. T., 139, 141, 181, 187
- Hill, A. T., and Metcalf, George, 142, 143, 157, 212, 213, 214, 215, 216, 217, 218, 221, 222, 244
- Hind, Henry Y., 424
- His-horse-reers, Indian brave, 408
- Historic period, 440, 443, 460
- Hit on Top Woman, Piegan woman, 432
- Hoes, 21
  - fragments of, 149, 159
  - scapula, 198, 199, 215, 241
- Hoffman, J. Jacob, 422, 423, 458, 459
- Hogan, crude, 422
  - Hogan, Navaho, 240, 249
- Hóhe refers to Assiniboin, 347, 383, 384, 386, 387, 388, 394, 396
- Holland, C. G., 9, 43, 48, 49, 52, 53, 65, 82, 84,
- Holland, C. G.: Preceramic and ceramic cultural patterns in Northwest Virginia, 1–129
- Holland, C. G.; Evans, Clifford; and Meggers, Betty J., 27
- Holy Bear, Indian brave, 411
- Holy Soul, Indian brave, 405
- Hooker County, north-central Nebraska, 140, 180, 182, 183, 247, 250, 251
- Horn, Tom, Blackfoot Indian, 435
- Horn, worked, 245
- Hornell, James, 285
- Horn Site (25HY4), 207, 256
- Horse, represented by Indians, 351,353, 354, 357, 358, 361, 374, 387, 393, 394, 395, 396, 398, 408, 409
- Horses, 425, 428, 429, 430, 433, 434, 435, 440
- Horse Shoe, Indian brave, 403
- Horseshoes, iron, 354, 358
- House I, 25HN37, 147 (fig.), 148, 157, 177
- House II, 25HN37, 147, 148 (fig.), 149 (fig.), 157, 159, 177
- House III, 25HN37, 149, 150 (fig.), 157, 159
- House IV, 25HN37, 150, 151 (fig.), 157, 177
- House V, 25HN37, 151, 152 (fig.), 157
- House VI, 25HN37, 152, 153 (fig.), 155 (table), 157, 172, 175, 176, 207, 249
- House II, Lovitt Site, 157, 212–213
- Houses, 146–157, 178, 249
  - dance, 370, 401, 402
  - discussion of, 155–157 (measurements), 240
  - Dismal River, 240, 249
  - log, 358, 363, 368, 370, 380, 401
  - Wichita, 249
- Howard, James H.: Dakota winter counts as a source of Plains history, 335–416
- Hudson, Colo., 232
- Huerfano County, Colo., 235
- Huffman Farm, Rileyville, 65
- Huitzilopochtli, Aztec god of war, 268
- Humphrey, Carl, 140, 181
- Humphrey Site (25HO21), 187–205, 255
- Hunká ceremony, Dakota Indians, 351, 353, 354, 369, 379
- Hunkpapa Indian band, 341, 342, 343, 344, 345, 348
- Hunkpapa winter count, 339, 370
- Hunkpati (Upper Yanktonai), 347, 377
- Hunkpatina (Lower Yanktonai), 347
- Hunting, 245, 251
- Hunting camp, temporary, 462
- Huscher, Betty H., and Huscher, Harold A., 142
- Hyde, George E., 437

- Ifaluk, Woleai Islands, 273, 274, 276, 277, 278, 279, 280, 283, 287, 289, 292, 293, 294, 295, 304
- Ilges, Maj. Guido, 399
- Imbelloni, J., 275, 276, 282
- Indian police uniform, shown by Indians, 406, 407
- Informants, other than Blackfoot, 436–437
- Iron, piece of, 154, 176, 187, 204, 217, 221, 238
- Iron Dog, Indian brave, 404
- Irrigation ditches, pre-white, 238
- Isantee Indians, 367
- *Ishilh Foeshavlap* (writing of Faraulep), 295, 296
- Island Fork, South Fork of Shenandoah, 38, 39
- Itázipčo band, *see* Sansarc.

- Jackrabbit, 204
- Jackson River, Highland County, Va., 10, 33
- James River, Rockbridge County, Va., 10, 11, 75
- Janitzio, village on Lake Patzcuaro, 265, 266, 267
- Japanese, stationed at Faraulep, 286
- Jarmen's Gap, Shenandoah National Park, 19

Jasper, 66, 166, 167, 168, 170, 179, 181, 182, 185, 187, 193, 195, 196, 209, 219, 220, 225, 246, 251
Jaw, Charley, Dakota Indian, 345
Jaw group, winter count of, 341, 344–345, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400
Jaw Variant, winter count, 345, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399
Jay, Edward, 421, 449
Jay, Phyllis, 421, 449
Jeancon, J. A., 244
Jefferson County, Colo., 230
Jennings, Jesse D., 140, 423
Jenning's Branch, near Lone Fountain, 29
Jim White Calf, Blackfoot informant, 429, 430, 449
Jingles, brass, 176, 179
  copper, 155, 179, 215, 222, 250
  metal, 251
  sheet iron, 182, 215, 250
Joe Tomahawk, Indian brave, 408
John's Run, near Stuart's Draft, 26
Jordan, Joe, Dakota Indian, 342
Jugla nigra, 149, 177
Julia Wades-in-the-water, Blackfoot Indian woman, 467
Jumping Bull, Sitting Bull's father, 385, 386

Kaneshiro, Shigeru, *see* Riesenberg, Saul H., and Kaneshiro, Shigeru.
Katakana writing, Japanese, 278, 280, 290, 296, 297
Kehoe, Alice, 421
Kehoe, Thomas F., 440, 457
Kehoe, Thomas F.: Stone tipi rings in North-Central Montana and adjacent portion of Alberta, Canada: Their historical, ethnological, and archeological aspects, 417–473
Kelly, Mrs. Fanny, white prisoner, 389
Kelso Site (25LN7), 211
Kelso, Mr.—, owner of Kelso Site, 211
Kettles, 250, 367
Keur, Dorothy L., 142
Keyser Farm Site, 8, 63, 85, 86
Kidder, A. V., 202, 241, 242, 243
Kills Plenty, Sitting Bull's brother, 385
Kills Two, Sioux Indian, interpreter, 346
Kinion, Trukese teacher, 290
Kiowa-Apache tribes, 440
Kiowa Indians, 360, 361, 440
Kiowa winter count, 371
Kite Place, Page County, Va., 65
Kittlitz, F. H. von, 285
Kivett, Marvin F., 139, 145, 159, 180 183, 187, 188, 189, 205
Knives, 169–170, 178, 186, 195–196, 197, 214, 220, 225, 241, 242, 245
  brown jasper, 186, 195
  chalcedony, 186
  chipped-stone, 248
  diamond-shaped, 186, 214, 242
  flint, 159
  iron, 285
  leaf-shaped, 186, 242
  metal, 427
  scapula, 215
  shell, 350
  two-edged, 242
Koiner Mound, Augusta County, Va., 8
Koyokee pits, 458
Krämer, A., 274, 278, 285, 289
Krieger, Herbert, 423
Kroeber, A. L., 273
Kutenai Indians, 423, 440

Laboratory of Anthropology, University of Nebraska, 139, 145, 172, 173, 210, 211, 213, 218, 219, 224, 226, 238
La Conte, Louis, trader, 363
Lacotah Love Dance circles, 458
Lacotah Sioux Indians, 422
Lafayette, Colo., 232
Lafayette Site (Lafayette, Colo.), 232, 256
Laird, Yuma County, Colo., 231
Lake Patzcuaro, Michoacan, 265, 266, 268
Lamotrek, Woleai Islands, 273, 277, 279, 285, 287, 289, 290, 292, 293, 294, 295
Lance, feathered society, 382
Langhorne family, owners of AU-38, 28
Larimer County, Colo., 227, 228, 231
Las Animas County, Colo., 235
Las Lauces, Costilla County, Colo., 235
Laurel Hill, between Middle River and Lewis Creek, 26, 31
Lean Bear, Indian chief, 397
Leaners, wooden, 154, 249
Leavitt, Carle, 446, 456
Le Beau, white trader, murderer, 370
Le Claire, Northern Ponca Indian, 371
Leon y Guerrero, Nicholas, help from, 273
Lewellen, Garden County, Nebr., 223
Lewis, H. P., 443, 456
Lewis, Oscar, 440, 455, 462
Lewis, T. H., 425
Lewis Creek, Augusta County, Va., 21, 26
Lewis Creek Mound (AU–20), 7, 21-22
Lewis Front Range, Rockies, 438
Limestone, charred, 217
Limon, Elbert County, Colo., 230
Limonite, 167, 172, 246, 250
Lincoln County, Nebr., 209
Lingle, Goshen County, Wyo., 236
Linville Site, Rockimgham County, Va., 8

Lipanan Apache, 243, 244
Lipscomb, Va., 20, 23
Literature cited, 128–129, 311–312, 415
Little Bear, Indian leader, 360, 397
Little Beaver, white trader, 358
Little Bird, Indian brave, 400
Little Calfpasture River, 42
Littlechief, Mrs. Eva, translator, 344, 362
Little Crow, Indian chief, 393, 400
Little Dog, Indian brave, 407
Little Light, North Blackfoot Indian, 435
Lockridge, Emery, owner of HD–8, 35
Lodge, Dismal River, 248–249, 252
Lodge, earth, 362, 368
    Plains earth, 240, 249
    skin, 422, 424, 436, 455, 456
Lodge covers, *see* tipi covers.
Lodge-cover weights, stone, 427
Lofton, on Pine Creek, 22, 28
Logan, missionary, 287, 288, 291
Logan County, Colo., 233
Lone Dog, Indian warrior, 386
Lone Dog count, 346, 352, 353, 354, 355, 356, 358, 359, 360, 361, 362, 363, 364, 366, 368, 370, 371, 377, 382, 383, 384, 386, 392
Lone Eater Band, Blackfoot Indians, 432
Lone Fountain, Middle River, 29
Lone Star, Indian chief, 397
Long Hair, Indian chief, 396, 397
Lookout Point (Site 25LN10), 212
Louis Bear Child, 429
Louis W. and Maude Hill Family Foundation, 421
Loup River, 143
Louse Bear, Indian brave, 405
Lovitt Site, Southwestern Nebraska, 142, 157, 159, 212–216, 237, 247, 248, 250, 255
Lowe Site (25HO7), 183–187, 255
Lower Loup (Pawnee), 240
Lowie, Robert H., 428
Lukunor, Nomoi group, 285
Lütke, F., 285
Lynnhaven, on South Fork, Shenandoah River, 39

MacCord, Howard, information from 8, 12, 15, 20, 21, 22, 23, 26, 40, 86
Madison Run, Rockingham County, Va., 37
Madison Run Rock Shelter (RM–3), 37
Mad Wolf, Blackfoot Indian, 430
Mahony, Frank, 273, 289, 290, 291, 292
Mallery, Garrick, 339, 340, 341, 345, 346, 348, 349, 350, 352, 353, 354, 355, 356, 358, 359, 360, 361, 362, 363, 364, 365, 367, 370, 371, 373, 377, 378, 379, 382, 383, 384, 385, 386, 387, 390, 392, 393, 396
Malouf, Carling, 423, 459
Mandan-Bismarck Indian Shriners organization, 340, 341, 342
Mandan Indians, 350, 356, 359, 369, 372, 381, 385, 402, 409, 411
Maninifek, Eauripik informer, 294
Mano, 56, 57 (table), 90–127 (tables)
Manson, Carl; MacCord, Howard A.; and Griffin, James B., 8, 63, 86
Many Horses Tails, Indian camping ground, 354
Mapia Island, 287
Marcellus Red Tomahawk, Sihasapa brave, 408
Marianas, 286
Marias River, southeast of Shelby, Mont., 441
Marmot (*Marmota monax*), 32, 34
Martell, Edward L., Indian informant, 436
Martin, H. T., 237, 238
Martin, Paul S.; Quimby, George I.; and Collier, Donald, 238
Mason, W. A., 275
Massey, Dr. William, 421
Material, preparation of, 8–9
Ma'toki dance structure, construction of, 428, 456
Mato Sapa count, Teton Dakota Indians, 346, 352, 353, 354, 355, 358, 359, 360, 362, 363, 364, 366, 368, 370, 371, 377, 382, 383, 384, 386, 392
Mats, 285
Matthews, Dr. Washington, 425
Matthews Site, *see* Humphrey Site.
Maul, grooved, 215, 243, 446
Maximilian, Prince of Wied, 424, 445, 457
Mayas, atlatl used by, 267
McCallum-Hofer Site (25CH7), 216, 255
McCarty, William, 458
McCary, Ben C., 81
McClintock, Walter, 427, 428, 430, 434, 446
McClure, Dr. F. A., botanist, 267
McConnell, H. H., 140, 232
McDermot, Douglas, 210
McDowell, Highland County, Va., 34, 35
McKittrick Creek, tributary of Middle River, 29
McLaughlin, Major, see White Beard.
McLean, John, 426
Mdéwakanton, Santee group, 347, 367
Measles, 362, 363, 377, 378, 409
    See also Smallpox.
Medicine Creek, Nebr., 210, 222
Medicine Creek 5, *see* Site 25FT9.
"Medicine getting" ritual, 422, 436
Medicine wheels, 422, 436, 457, 458
Meggers, Dr. Betty J., 21
Meinicke, Carl E., 285
Melanesia, 286
Meleagris gallopavo, 32, 34
Men's house, beams from, 274, 275, 278
Merir Island, 287

Mesodon sayanus, 34
    M. thyroidus, 32
Mesomphix cupeus, 34
Metals, trade, 215
Metate, sandstone, 155, 172, 215, 243
Metcalf, George, 140, 142, 160
Métraux, Alfred, 275
Mica, sheet, 42, 164, 215
Mica, tempering material, 42, 164, 184, 189, 191, 207, 211, 213, 214, 215, 216, 218, 228, 229, 231, 232, 233, 234, 235, 236, 247
Micronesians, 285
Middens, 250
Middle Butte, Sweet Grass Hills, 426
Middle Loup River, 180, 183, 187, 205, 208
Middle River, Va., 15, 17, 22, 26, 27, 29, 30, 31, 75, 78
Middle Sitter, Blackfoot Indian, 430
Miles, General, 390
Milk River Ridge, Blackfoot Reservation, 449, 451 (fig.)
Millboro Springs, on Cowpasture River, 31
Mill Creek, 2 miles from Goshen, 41
Miller, Carl, information from, 12
Mill Mountain, west of Calfpasture River, 11
Mindeleff, Cosmos, 240
Mink, 204
Minneconjou band, Teton Dakota tribe, 346, 348
Mirror, dance, 414
Misililing, *see* Misinining.
Misinining, American Protestant Missionary, 289
Missouri River, 363, 364, 366, 440
Missouri River Basin Survey, Smithsonian Institution, 139, 143, 145, 180, 187
Mixbloods, Red River, 395
Modern Blackfoot Camp, 464–470
Money, Indian boy, 404
Money paid to Indians, shown by Indians, 403
Monterey, Highland County, Va., 33
Mooney, James, 371, 440
Moose Jaws Forks, 424, 425
Moosemen Reserve, Saskatchewan, Cree Reserve, 436
Moran, W. J.; Covell, R.; and Abashkin, B. J., 145
Morrison, Jospeh P. E., shells identified by, 32
Morrison, Jefferson County, Colo., 230
Mortuary customs, 251
Mount Morrison, Colo., 232
Mount Solon, Va., 24, 25
Mudalia carinata, 32, 34
Muddy Creek, Dundy County, Nebr., 217
Mudhens, 266
Mule deer, 143
Mullen, Hooker County, Nebr., 180, 181, 182, 183, 187, 205, 207, 208
Mullen Reservoir area, Hooker County, north-central Nebraska, 139, 180
Mulloy, William T., 421, 422, 456, 458
Museum of the Plains Indian, 421, 435, 446, 449, 459, 464
Musical rasps, bone, 242
Mussels, 245
Mustoe, Highland County, Va., 33

Nakayama, Tosiwo, help from, 273
Namoluk, Caroline Islands, 285
Namonuito, Caroline Islands, 285, 288, 289
Natural Chimneys, near Mt. Solon, Va., 25, 52
Nebraska State Archeological Survey, 224
Nebraska State Historical Society Museum, 139, 142, 180, 181, 182, 183, 187, 191, 205, 207, 208, 209, 212, 213, 217, 218, 219, 220, 222, 223
Necklace, bone hair-pipe, 393
Needles, 174
    bone, 207, 221
    eyed, 173, 174, 198, 202, 221, 242, 248
Neotoma sp., 32
Newell, P., 217
Nez Percé, 382, 397
Nichols Site (25DN1), 217–221, 255
Nicollet, J. N., 425
Nomoi Island, 287, 291, 309
North American Indian Days Celebration, 464
North Battleford, Saskatchewan, 436
North Dakota State Historical Museum, Bismarck, 340, 342, 343, 344, 345
Northern Crown stars, 427
North Fork, Shenandoah River, 10
North Loup River, 208
North Platte, Nebr., 209, 210, 211, 212, 221
North Platte River, 210, 223, 245
North River, Va., 24, 25, 39, 42
North Saskatchewan River, 440
Northwest Virginia, geographical description of, 9–43
Nose flute, 276
No Two Horns (Blue Thunder variant), winter count, 342, 348, 349, 356, 357, 359, 360, 361, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413
No Two Horns, Hunkapapa Band, Teton Dakota Indians, 342, 348, 349, 350, 351, 352, 353, 354, 355
Nunivak Eskimo, spear thrower used by, 266
Nuttall, Zelia, 267, 268

Oak trees, 177
Obsidian, 167, 181, 182, 194, 206, 207, 208, 211, 216, 219, 225, 229, 232, 246, 251, 268, 449
Ocher, yellow, 215
Odocoileus virginianus, 32, 33, 177
Oglala band, Teton Dakota Tribe, 346, 348
Oglala count, *see* Dakota winter count.
Oglala Sioux Indians, 437
Ojibwa Indians, 366
Old Man Running Crane, Blackfoot Indian, 431
Old Whoop-up Trail, 443
Oleai script, 273
Olimarao, Woleai Islands, 273
Olter, Bailey, help from, 273
Omaha Indians, 347
"Omaha" refers to Ponca or Omaha Indians, 347, 351, 364, 365, 367, 401
One Gun, Blackfoot Indian, 460
One Star, Indian brave, 397
Oóhenoⁿpa (Two Kettle), Teton band, 348
Oregon Basin, southeast of Cody, Wyo., 441
Ornaments, bone, 242
  chest, 21
Osborne, Dr. Douglas, 421
Otter Lodge, tipi of Tom Horn, 435
Oval pit, 32

Pabobo's adoption ceremony, 379
Paint, 172, 192, 215, 250
  caliche, 250
  charcoal, 250
  hematite, 42, 172, 203, 250
  limonite, 250
Paint brush, bone, 215, 241, 248, 251
Paint pot, fragment, 25
Paláni or Padáni, refers to Pawnee or Arikara, 347, 360
Palau Island, 286, 287, 295, 297
Palliday, Alice, Indian woman, 437
Palo azul, wood used for atlatl, 267
Palomas tribe, 243
Parfleches, use of, 435, 444, 466, 467
Parkins, H. S., 404
Parkins, Mrs. H. S., death of, 410
Pawnee, 240, 252, 347, 353, 354, 360, 370, 373
Pecking stones, 215
Pecos, 241, 242, 243, 244, 247, 252
Pecos-Dismal River relationships, 241–244
Pegs, wooden, used for tipi covers, 460
Pendant, 22, 23, 27, 30, 36, 57 (table), 215, 243
Pend d'Oreille Indians, 440
Period, Early Woodland, 84
  Historic, 86–87
  Late Woodland, 85, 86
  Middle Woodland, 84
  Middle-Late Woodland, 84
  Protohistoric, 85–86
Pete Little Light, Blackfoot informant, 429
Phatamu, *see* Atlatl.
Phillip Long Farm, Page County, 65
Philippines, 285
Phillips, Paul C., 427
Phonetic table, Dakota language, 416
Pictographs, Dakota Indians, 349
Picuris, location of, 239, 244
Piegan Indians, 426, 429, 430, 432, 440, 460
  Northern, 429, 432
  Southern, 429
Pigue Island, Faraulep atoll, 293
Pikelot, Woleai Islands, 273
Pima counting sticks, 371
Pine Creek, Augusta County, Va., 22, 28
Pine Ridge Reservation, S. Dak., 437
Pines, lodge-pole, 427
Pine trees, 438
Pins, wooden, 430
Pipe of peace, 361
Pipes, 21, 84, 164, 172, 248
  catlinite, 172, 241
  chlorite, 21, 27, 36, 39, 55 (fig.), 56, 57 (table), 58, 90–127 (tables)
  clay, 55 (fig.), 56, 57 (table), 58, 90–127 (tables), 206, 238, 248
  "cloudblower," 193, 215, 218, 248
  decoration, 192, 214
  elbow-shaped, 185, 193, 214, 215, 243
  gray-green soapstone, 21
  late Rio Grande style, 238
  limestone, 215
  monitor, 21
  platform, 192–193
  pottery, 142, 164, 185, 192, 212, 214, 218
  steatite, 84
  stone, 26, 159, 172, 215, 248
  trade, 210
  tubular, 193, 214, 215, 240, 243, 244, 248
Pipe stems, trade, 210
Piserach, Namonuito atoll, 289, 290
Pits, Dismal River baking, 240, 250
  other, 159–160, 188 (table), 213
  Plains cache, 240, 250, 252
  roasting, 158 (table), 159, 174, 177, 178, 188, 204, 213, 217, 238, 250
  trash-filled, 148, 149–150, 158–159, 173, 174, 178, 183, 188–189, 205, 213, 217, 238, 250
Plains Apache, *see* Dismal River people.
Plains Cree Indians, 424, 425
Plains-Dismal River relationships, 238–241
Plains-Ojibwa—Cree-Assiniboin groups, 347, 366, 387, 388, 393
Platte County, Wyo., 236
Platte Reservoir area, Wyo., 139
Platte River, 236
Platte Valley, 212

Pleets, John P., 413, 414
Plumb, W. H., information from, 8, 17, 18
Plums, 143, 216, 245
Points, 149, 150, 151
Polishers, bone, 241
Polka-Dot Farms, owners of AU-37, 28
Polygyny, practice of, 435
Polynesia, 286
Polynesians, 284, 285
Ponca Indians, 347, 351, 371, 401
Ponca winter count, lost, 371
Poplar Island component, Pennsylvania, 82
Port Republic, Rockingham County, Va., 10, 36, 37
Postholes, 146, 147 (fig.), 148 (fig.), 149 (fig.), 150 (fig.), 151 (fig.), 152 (fig.), 153 (fig.), 154, 155, 156, 188, 205, 212, 213, 222, 249, 250
Post molds, 213
Pothook, 367
Potsherds, 16, 17, 19, 20, 21, 22, 23, 24, 26, 27, 28, 29, 30, 31, 33, 34, 35, 37, 39, 40, 41, 90–127 (tables), 158, 183, 184, 187, 205, 208, 217, 238
  Albemarle Series, 21, 27, 58, 59 (definition), 61, 62 (graph), 64, 83, 84, 120–127 (tables)
  body, 149, 150, 151, 155, 158, 159, 184, 185, 192, 209, 223, 226, 227, 235
  Great Bend, 251
  hardness of, 189 (table), 190
  lip forms, 184, 190, 209, 233
  Marcey Creek series, 58, 59 (definition), 61, 62 (graph), 83, 120–127 (tables)
  New River Series, 58, 59 (definition), 62 (graph), 63, 64, 85, 86, 120–127 (tables)
  Radford Series, 27, 32, 36, 42, 58, 60 (definition), 61, 62 (graph), 63, 64, 71, 73 (map), 74, 84, 85, 86, 121–127 (tables)
  rim, 149, 150, 151, 155, 158, 159, 166 (fig.), 181, 184, 190, 191, 206, 207, 218, 224
  Southwestern, 251
  Stony Creek Series, 24, 58, 60 (definition), 61, 62 (graph), 64, 69, 71, 72 (map), 74, 83, 84, 121–127 (tables)
Potter, Ethel, Arapaho woman, 436
Pottery, 33, 38, 62 (graph), 68, 120–127 (tables), 160–165, 178, 183, 184–185, 189–193, 205–206, 213–214, 218–219
Pottery, analysis and interpretation of, 58–65, 160–165
  basic differences in, 60–61, 62 (graph)
  black, 226, 227, 228, 229, 230, 231, 232, 233, 235, 236, 243
  black to dark gray, 218, 223, 225, 232, 234
Pottery—Continued
  buff, 231, 233, 236, 238
  buff and black, 231
  buff to black, 223, 227, 232, 234, 237
  burnt clay, 42
  coiled, 214
  color, 162, 178, 181, 182, 184, 185, 187, 189, 192, 206, 210, 213, 218, 222, 223, 224, 246
  cord-roughened, 210, 226, 227, 230, 232, 233, 234, 236
  decoration, 162–163, 165 (fig.), 166 (fig.), 178, 182, 184, 185, 190, 191, 206, 208, 209, 210, 214, 217, 218, 222, 223, 226, 229, 232, 233, 234, 235, 243, 247
  density, 162
  Dismal River, 141, 142, 149, 150, 151, 155, 159, 160 (table), 164, 179, 181, 182, 184, 187, 189, 191, 192, 207, 208, 209, 210, 211, 212, 216, 217, 221, 223, 224, 225, 226, 227, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 243, 244, 246–247, 252
  Dismal River sand-tempered, 142
  Glen Elder, 207, 208, 211
  Glen Elder-White rock, 239
  gray to gray-tan, 43, 235
  grooved paddling, 162
  hardness, 162, 211, 214, 234
  incised zigzag decorations, 206, 214
  "Kapo" black, 237
  Keiser Cord Marked, 86
  late red, 237
  late Rio Grande micaceous culinary, 142, 237
  limestone-tempered, 64, 84, 85, 86
  lip-decoration, 165 (fig.), 214, 218, 227, 232
  Lovitt Mica Tempered, 142, 160, 161, 164, 230, 247
  Lovitt Plain, 142, 160
  Lovitt Simple Stamped, 142, 160
  orange, 227
  Page Cord-Marked, 86
  painted, 185, 192, 211, 218, 221, 234
  Pojoaque, Polychrome, 237
  polished, 184
  porosity, 162
  Potomac Creek, 86
  punctate decorations, 206
  "Quiviran," 238
  Radford Cordmarked, 36
  Radford Series Plain, 36
  red, 230
  red and black on orange-buff, 211, 212
  rim forms, 164 (fig.), 184, 190, 206, 209, 214, 222, 223, 226, 227, 228, 230, 233, 235, 236, 247
  sand-tempered, 85, 160–161, 182, 185, 187, 189, 191, 192, 206, 209, 213, 214, 218, 222, 223, 225, 226, 227, 229, 230, 231, 232, 233, 234, 235, 236, 237, 247

Pottery—Continued
  shapes, 162, 247
  shell-tempered, 64, 86
  shoulder area, 237
  simple stamped, 162, 178, 182, 184, 185, 187, 189, 190, 192, 206, 209, 212, 214, 216, 217, 218, 228, 229, 230, 231, 233, 240, 247
  surface treatment, 162–163, 184, 189, 206, 209, 212, 214, 216, 217, 218, 222, 225, 226, 231, 233, 234, 235, 236, 246, 252
  Taos ware, 240
  tempering, 160–161, 178, 185, 187, 189, 206, 213
  Tewa, 237
  texture, 161, 184, 185, 187, 189, 190, 191–192, 206, 209, 211, 218, 223, 225, 227, 228, 229, 230, 232, 234, 237
  thickness, 164, 190, 232, 236, 237
  thong-wrapped paddling, 162, 240
  trade, 252
  Upper Republican, 141, 192, 209, 210, 212, 221, 223, 225, 226
  Woodland, 181, 214, 223, 226, 233
Pottery handle, 191, 231
Pottery lug, 191
Potterymaking tradition, 26, 29
Pottery series and types, 120–127 (tables)
Powder Creek (River), 382
Powder horn, worn by Indian, 367
Prairie chickens, 143
Prairie Dog Creek, 145, 146
Prairie dogs, 143
Preceramic and ceramic cultural patterns in northwest Virginia, 7
Preceramic complex, 57 (table), 58, 65, 68, 69, 70 (map), 74, 75, 76, 78, 79, 81, 82, 87
Pre-horse Period, 462
Premeau, Jean, interpreter, 346
Prisoner, represented by Indians, 389, 395
Projectile points, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25 (table), 26, 27, 28, 29, 30, 31, 33, 34, 35, 36, 37, 38, 39, 40, 41, 48, 53, 81, 155, 156 (chart), 159, 167–168, 178, 179, 182, 185 (table), 187, 194 (table), 198, 206, 209, 219 (table), 225, 238, 242, 246, 446
  antler, 32, 215, 241, 242
  bone, 199–200, 215, 241, 242
  brass, 215
  Contracting Stemmed Type K, 25 (table), 44 (fig.), 46, 50, 82, 90–127 (tables)
  Crude Triangular Type D, 44 (fig.), 46, 49, 50, 51, 52, 53, 90–127 (tables)
  Eared Type O, 25 (table), 44 (fig.), 47, 90–127 (tables)
  flint, 155, 446
  Hanna type, 440
Projectile points—Continued
  Lanceolate Type F, 44 (fig.), 46, 50, 51, 90–127 (tables)
  Large blades, unclassified, Type V, 25 (table), 47, 49, 50, 51, 75, 90–127 (tables)
  Large Contracting Stemmed Type P, 45 (fig.), 47, 90–127 (tables)
  Large Parallel-sides Stemmed Type Q, 25 (table), 45 (fig.), 47, 48, 49, 50, 51, 81, 82, 90–127 (tables)
  Large Pointed Base Type S, 45 (fig.), 47, 51, 90–127 (tables)
  Large Rounded Base Type U, 45 (fig.) 47, 49, 50, 81, 90–127 (tables)
  Large Side-notched Type R, 45 (fig.), 47, 51, 90–127 (tables)
  Large Triangular Blade Type T, 45 (fig.), 47, 51, 90–127 (tables)
  McKean, 440
  Medium Triangular Type B, 36, 43, 44 (fig.), 48, 49, 50, 51, 52, 53, 83, 90–127 (tables)
  Notched Base Type G, 44 (fig.), 46, 51, 90–127 (tables)
  Notched Stemmed Type I, 25 (table), 44 (fig.), 46, 48, 49, 50, 51, 81, 82, 90–127 (tables), 222
  Ovoid Base Type J, 25 (table), 44 (fig.), 46, 49, 50, 82, 90–127 (tables)
  Parallel-sided Stemmed Type L, 25 (table), 44 (fig.), 46, 48, 49 , 50, 51, 90–127 (tables)
  Pentagonal Type E, 44 (fig.), 46, 51, 84, 90–127 (tables)
  Side-notched Type M., 25 (table), 44 (fig.), 47, 49, 50, 51, 52, 81, 82, 90–127 (tables), 216
  Small triangular Type A, 23, 30, 43, 44 (fig.), 48, 49, 50, 90–127 (tables), 241, 244
  Stubby-barbed type H, 25 (table), 44 (fig.), 46, 50, 90–127 (tables)
  Triangular Type C, 24, 25 (table), 27, 43, 44, (fig.), 48, 49, 50, 51, 52, 53, 82, 83, 90–127 (tables), 222, 242, 248
  Type NBa, 155, 156 (fig.)
  Types of, 44 (figs.), 90–127 (tables), 156 (chart), 167 (table)–168, 178, 185 (table), 214, 220 (table), 225, 242
  Unclassified Type N, 25 (table), 47, 51, 90–127 (tables)
Projectile-point and blade types, rock material, chips, and other artifacts, and pottery classification tables, 90–127
Projectile points and large blades, 43–53, 68, 170
Promontory complex (Utah), 241, 245, 247, 252
Promontory-Dismal River relationships, 244–245, 252

Promontory Point, north-central Utah, 244
Protohistoric period, 240, 241, 245, 440, 460
Pueblo Site (14SC1), 237–238, 250
Pugh, Stanley, Oglala Sioux Indian, 437
Pulap, Caroline Islands, 273, 280, 287
Pulo Anna, 287
Pulusuk, Caroline Islands, 273, 285, 287
Puluwat, Caroline Islands, 273, 274, 276, 277, 278, 280, 285, 287, 289, 290, 291, 292, 295, 297
Pumpkin Creek, Morrill County, Nebr., 224
Pumpkin Creek Site (25MO2), 224–225
Punches, bone, 186, 215, 240, 241, 248
Putínska, treaty with, 384

Qu'appelle Valley, 424, 425
Quartelejo, ruins of, 237, 239
Quartelejo Lipanans, 243
Quartz, white, 11, 24, 66
Quartz boulders, 197
Quartz chips, 31, 40, 41, 66, 67, (table), 75, 90–127 (tables), 181, 188, 193, 229, 246
Quartz crystal, 42, 56, 57 (table), 58, 65, 66, 90–127 (tables), 167, 193
Quartzite, brown, 196
  gray to yellow-gray Erwin-Antietam, 11, 66
  green, 196
  purple Erwin, 11, 41, 66
Quartzite boulders, 445
Quartzite rocks (chips), 11, 15, 19, 20, 22, 23, 24, 27, 28, 29, 30, 31, 35, 37, 38, 41, 65, 66, 67 (table), 68, 71, 74, 75, 81, 90–127 (tables), 181, 182, 186, 187, 193, 195, 196, 209, 219, 225, 228, 229, 246
Quartzite-using stations, designation of, 14, 17, 19, 20, 22, 23, 26, 27, 28, 29, 36, 37, 38, 39, 40, 41, 51, 56, 68, 70 (map), 74, 75, 78, 79, 81, 87
Querecho people, 243
Quick's Mill, Augusta County, Va., 17

Rabbit (*Sylvilagus floridanus*), 32, 34, 204
  See also Jackrabbit.
Rain-in-the-face, Indian chief, 395, 408
Ramarui, David, help from, 273
Ramsey, Charles, collections by, 24, 25 (table)
Ramsey's Gap, on Calfpasture River, 25
Rappahannock River, 86
Red Bow, Indian brave, 399
Red Breast, white man shown by Indians, 368
Red Bull, Indian brave, 400
Red Dog, Indian brave, 410
Red Hail, Indian brave, 400
Red Painted Feet, Blackfoot Indian, 429
Red River, 424
Red Robe, Indian warrior, 386
Red Tomahawk, Indian brave, 406
Red Valley Component, New Jersey, 82
"Ree," refers to Arikara, 347, 350, 360, 368, 369, 372, 373, 375, 378, 379, 381, 385, 392
Reed (*Arundo donax*), 267
Reghipol, Woleai teacher, 294
Religion, 251
Renaud, E. B., 142
Republican City, Harlan County, Nebr., 179
Republican River, 145, 146, 167, 179, 221, 230, 251
Resapechik, Trukese teacher, 290
Rib sections, worked, 203
Rider, Ambrose, Gros Ventre Indian, 437
Riesenberg, Saul H., and Kaneshiro, Shigeru: A Caroline Islands script, 269–333
Rifle, carried by Indian, 367, 380, 386, 388
  carried by white man, 396
Riggs, Stephen R., 347, 360
Rings, brass, hair ornaments, 357
Rio Grande River, 235
River Basin Surveys, 139, 182, 183, 187
River terrace, meaning of, 14
Robe, worn by Indians, 386
Roberts, Frank H. H., Jr., 140
Robert S. Peabody Foundation Museum, Phillips Andover Academy, 139
Robinson, Will G., 362
Roby, Roy, information from, 8, 30
Rockbridge Baths, 11, 40, 41
Rockbridge County (RB), 10, 12, 13 (map), 40–43, 74
Rockbridge County sites:
  RB–1 (east of Wade's Mill), 40
  RB–2 (Hayes' Creek Mound), 8, 40–41, 85
  RB–3 (on Hayes' Creek), 41, 52, 61, 77 (chart)
  RB–4 (Rockbridge Baths), 41, 77 (chart)
  RB–5 (right bank of Calfpasture River), 41, 68, 77 (chart)
  RB–6 (on slope to Mill Creek), 41, 52, 68, 77 (chart)
  RB–7 (Battle or Bell Mound), 8, 42, 61, 63, 77 (chart), 78, 85
Rockingham County (RM), 11, 12, 13 (map), 36–40, 65
Rockingham County sites:
  RM–1 (South Fork, Shenandoah River), 12, 13 (map), 36, 50, 57 (table), 77 (chart), 80
  RM–1A (near RM–1), 13 (map), 36, 50
  RM–2 (west of RM–1), 36–37, 77 (chart)
  RM–3 (Madison Run Rock Shelter), 37, 77 (chart)
  RM–4 (northeast of Port Republic), 12, 13 (map), 37, 38 (table), 48,

Rockingham County sites—Continued
  57 (table), 61, 64, 67 (table), 74, 77 (chart)
  RM-4A (southwest of RM-4), 12, 13 (map), 37-38 (table), 48, 56, 64
  RM-4B (northwest of RM-4A), 12, 13 (map), 38, 50, 66, 75, 77 (chart)
  RM-5 (south of bridge at Island Fork), 37-39, 77 (chart)
  RM-6 (near RM-5), 38, 39, 52, 57 (table), 77 (chart)
  RM-7 (Lynnhaven, on South Fork), 39, 77 (chart)
  RM-8 (50 yards from RM-6), 38, 39, 50, 67 (table), 77 (chart)
  RM-9 (northwest of Weyer's Cave, on North River), 39
  RM-10 (Grottoes, on South River), 39-40, 77 (chart)
  RM-11 (southwest of Elkton), 40, 57 (table), 77 (chart)
  RM-12 (bank of South Fork), 40, 57 (table), 77 (chart)
Rock material, 65-74
Rock shelters, 78
Rosie A. Young Man, Mrs., Blackfoot, interpreter, 429
Roundtop, hill near Crawford, Nebr., 226
Roy, Rob, discoverer of AU-27, and AU-28, 24
Rubbing tools, bone, 241
Ruffner Place, Page County, 65
Ruins, stone-walled, 238
Running Crane, chief of Lone Eater Band, 432
Running Rabbit, Indian chief, 427
Russell, Frank, 371

Sagebrush, 143
Saipan, Marianas, 285, 297
Salishan tribe, 440
Sanasesli, location of, 239
Sand, charcoal-stained, 183
Sanderville, Richard, 446
Sandhills, Central Plains area, 143, 144, 180
Sandhills sites, 180-208
  environmental setting, 180-181
Sandstone, brown, 220
  buff, 198
  Cretaceous, 438, 445
  Ogalalla, 197
  soft red Dakota, 167, 171, 172, 193, 197
  white or light, 167, 171, 186, 188, 220
Sansarc band, Teton Dakota tribe, 345, 348, 362, 377, 392
Santee group, Dakota tribes, 347 (list), 367
Santo Domingo, *see* El Quartelejo.
Sappa Creek, 145
Satawal, Woleai Islands, 273, 274, 277, 278, 280, 283, 285, 287, 290, 291, 292, 293, 295
Savannah River Focus, North Carolina, 82
Saville, Marshall H., 268
Scalps, 362, 367, 376, 377, 385, 386, 387, 388, 392, 394, 395, 396, 397, 400
Scapulae, worked, 173, 174, 198-199, 220
Schaeffer, Dr. Claude E., 421, 427, 459
Schist, 182, 197, 246
Schmitt, Karl, 86
Schulenberg, Ray, translator, 344
Schultz, James Willard, 427
Sciurus calolinensis, 32
Scott City, Scott County, Kans., 237
Scott County Pueblo site, West Central Kansas, 142, 237-238, 239
Scotts Bluff County, Nebr., 225
Scrapers, 17, 19, 20, 22, 23, 26, 27, 28, 29, 30, 35, 36, 39, 40, 84, 149, 150, 151, 155, 169, 170-171, 194, 196-197, 206, 219, 225, 226, 245
  elk-antler, 383, 384
  end, 55 (fig.), 56, 57 (table), 58, 81, 90-127 (tables), 159, 171, 178, 182, 186, 196, 197, 214, 215, 219, 222, 238, 240, 241, 242, 244, 248
  hafted, 55 (fig.), 56, 57 (table), 58, 81, 90-127 (tables)
  side, 55 (fig.), 56, 57 (table), 90-127 (tables), 167, 171, 178, 182, 186, 196, 197, 206, 214, 216, 241, 242, 248
  snub-nosed, 242
  tanged, 242, 244
Seals, 266
Sea otter, 266
Secoy, Frank R., 143
Sedgwick County, Colo., 229
Seidling Hill, on Calfpasture River, 25
Seneca, Nebr., 181
Serifino or Serbino, helper of Soshaki, 296
Setzer, Henry W., animals identified by, 32, 33
Shaddox, Carl, 421
Shaft polishers, 171, 186
Shaft wrenches, bone, 149, 173, 174, 198-199, 215, 242, 248
Shale, 438
Shave One Side, Mrs., 414
Shaw's Fork, tributary of Cowpasture River, 35
Shell species:
  Anguispira alternata, 32
  Elliptio complanatus, 32, 34
  Haplotrema concavum, 32
  Heliodiscus parallelus, 34
  Mesodon sayanus, 34
  M. thyroidus, 32
  Mesomphix cupeus, 34
  Mudalia carinata, 32, 34
  Triodopsis albolarbris, 32
  T. fraudulenta, 34

Shell species—Continued
  T. tridentata juxtidens, 32, 34
  Unionerus tetralasmus, 177
  Ventridens ligera, 32
Shells, 32 (list), 33 (list), 34 (list), 177, 285
  mussel, 159
  turtle, unworked, 158, 177, 204
  unworked, 149, 151, 158, 179
  worked, 185, 187, 215
Shenandoah Mountain, Va., 16, 35
Shenandoah National Park, Va., 19, 37
Shenandoah River, *see* North or South Fork.
Shenandoah Valley, 86
Shepard, Anna O., 140, 161
Sherds, Great Bend, 142
  southwestern, 142
  See also potsherds.
Shinny stick and ball, shown by Indians, 406
Ship, represented by Indians, 351
Shippee, J. M., 145
Shoshone Basin, Wyo., 458
Shoshoni tribe, 437, 440
Shutterly's Mill, Staunton, Va., 30
Sičáŋgu band, Teton Dakota tribe, 346, 348, 361
Signal Butte, Nebr., 141, 222, 225, 440
Sihásapa Indian band, 341, 342, 343, 344, 348, 350, 355
Silk, Indian brave, 412
Silk, Mrs. Harry, wife of Silk, 412
Sioux County, Nebr., 243
Sioux Indians, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 364, 365, 367, 368, 369, 370, 372, 373, 378, 380, 387, 391, 395, 396, 399, 424, 426
Sirom, Trukese teacher, 290
Sisseton, Santee group, 347, 367
Site:
  A (historic period), 75
  A–B, 76
  B–C, description of, 75, 76
  B and M, 256
  C–D, desciption of, 75, 76
  D–E, description of, 75, 76
  E–F, description of, 76
  F–G, description of, 76
  Colo. E:1:7 (Larimer County, Colo.), 227–228, 256
  Colo. D:4:2; 227, 256
  Colo. E:2:1 (northern part of Weld County), 228, 256
  Colo. E:7:1 (South of Cornish, Weld County, Colo.), 228–229, 256
  Colo. E:14:11 (5 miles east of Fort Lupton), 229, 256
  Colo. F:15:1 (10 miles north of Akron, Washington County, Colo.), 229, 256
  Colo. G:4:GEN. (Sedgwick County, Colo.), 229, 256
Site—Continued
  Colo. G:16:6 (2 miles southwest of Wray, Yuma County), 229–230, 256
  Colo. G:16:8 (10 miles north of Wray), 230, 256
  Colo. K:5:1 (Summit County, Colo.), 230, 256
  Colo. K:8:2 (4 miles south of Morrison), 230, 256
  Colo. M:9:6 (6 miles east of Buick, Elbert County), 230, 256
  Colo. M:10:2 (13 miles northwest of Limon), 230, 256
  Colo. N:4:1 (6 miles south of Laird), 231, 256
  Colo. S:12:5 (Pueblo County, Colo.), 233, 256
  Colo. U:5:9 (17 miles northwest of Eads), 234, 256
  Colo. Y:12:GEN.; 233, 256
  Colo. Y:13:1 (southern boundary of Colorado), 234, 256
  Colo.Y:14:1 (Castilla County, Colo.), 234–235, 256
  Colo.Z:5:7 (Huerfano County), 235, 256
  Colo.Z:6:1, 235,256
  Colo.Z:14:2 (Las Animas County), 235, 256
  WYO.AA:6:1 (Albany County, Wyo.), 236–237, 257
  WYO.U:11:1 (15 miles north of Lingle), 236, 257
  14SC1 (west-central Kansas), 141, 178, 237–238, 250, 257
  17 (Larimer County, Colo.), 231, 256
  24GL350 (tipi-ring camp), 465 (fig.)
  24GL390 (above north bank of Greasewood Creek), 447, 448 (fig.), 449
  24GL422, tipi ring of White Man, 431 (fig.)
  24GL427, tipi ring of Running Crane, 432
  24GL486, south slope Milk River Ridge, 449, 452 (fig.), 453 (fig.)–455
  24GL490, Milk River Ridge, Blackfoot Reservation, 449
  24GL498 (tipi-ring camp), 465 (fig.)
  24GL520 (bison drive site), 461 (fig.)
  24GL584, north shore Spring Lake, Blackfoot Reservation, 449, 450 (fig.)
  25BN2 (Bull Canyon Site), 222–223, 255
  25C25 (30 miles northwest of Mullen), 208, 255
  25C27, 208, 255

Site—Continued
  25C28 (12 miles northwest of Brownlee), 208, 255
  25C29 (9 miles north of Brownlee), 208, 255
  25CH1 (Lovitt Site), 144 (map), 178, 212–216, 218, 237, 245, 247, 249, 255
  25CH7 (McCallum-Hofer Site), 216, 255
  25CH8 (Skelton Site), 216, 255
  25CH14 (Baker Site), 217, 255
  25DK5 (22 miles southwest of Tie Siding, Wyo.), 176
  25DN1 (Nichols Site), 142, 144 (map), 178, 217–221, 255
  25FR15 (1 mile west of Bloomington), 221, 255
  25FT9 (southwestern Nebraska), 141, 142, 144 (map), 222, 255
  25GD2 (Ash Hollow Cave), 144 (map), 223–224, 237, 255
  25HN37, environmental setting, 145–146, 255
  25HN37, houses, 146–157, 158 (table), 173 (table), 177 (table), 218
  25HN37 (White Cat Village), Harlan County Reservoir, south-central Nebraska, 139, 140, 144 (map), 145–180, 224, 242, 249
  25HN44, southeast of Republican City, Nebr., 179–180, 255
  25HO1 (south bank of Dismal River), 181, 225, 255
  25HO2, south bank of Dismal River, 180, 225, 255
  25HO3, about 15 miles south of Mullen, 180–181, 255
  25HO4 (fork of Dismal River), 181, 255
  25HO5 (8 miles east of Mullen), 180, 182, 255
  25HO7 (the Lowe Site), Mullen Reservoir area, 139, 144 (map), 180, 183–187, 255
  25HO9 (northeast of Mullen), 180, 187, 255
  25HO21 (Mullen Reservoir area, Hooker County, north-central Nebraska), 139, 144 (map), 174, 180, 183, 185, 187–205, 224, 255
  25HO24 (Mullen Reservoir area, Hooker County, north-central Nebraska), 139, 180, 205–207, 255
  25HO30 (8 miles southeast of Mullen), 207, 256
  25HO31 (13 miles southeast of Mullen), 207, 256
  25HO32 (15 miles southwest of Mullen), 207, 256
  25HY4 (3 miles northwest of Palisade, Nebr.), 207, 256
  25LN2 (8 miles southwest of North Platte, Nebr.), 209, 256
  25LN3 (1 mile northwest of Somerset, Nebr.), 210, 256
  25LN4 (6 miles south of North Platte), 210, 256
  25LN5 (north of North Platte Nebr.), 210–211, 256
  25LN6 (opposite North Platte, Nebr.) 211, 256
  25LN7 (Kelso Site), 211, 256
  25LN9 (2 miles north of Dickens, Nebr.), 211–212, 256
  25LN10 (3 miles south of North Platte), 212, 256
  25MO2 (Pumpkin Creek Site), 224–225, 256
  25SF1 (Signal Butte Site), 144 (map), 225, 256
  5SU2, *see* Site Colo.K:5:1
  25SX00 (Roundtop Site), 226, 256
  25SX301 (Glenn Site), 226, 256
  25TM1 (5 miles west of Thedford), 208–209, 256
  26, 231, 256
  38 (Larimer County), 231, 256
  39FA45 (Fall County, S. Dak.) 237, 257
  39FA83, 237, 257
  48PL11 (near Platte River, Platt County), 236, 257
  101 (Boulder County), 231, 256
  104 (south of Mount Morrison), 231–232, 256
  Billy Big Spring, 440
Site descriptions, 12, 13 (map), 57 (table), 67 (table), 75–76, 77 (chart)
Sites:
  in Lincoln County, Nebr., 209–212
  in northeastern Colorado, 227–233
  in southeastern Colorado, 233–235
  in southeastern Wyoming, 236–237
  in southwestern Nebraska, 212–222
  in southwestern South Dakota, 237
  in western Kansas, 237–238
  in western Nebraska, 222–227
  Middle Period in the Plains, 440
Sitting Bull, 385, 391, 396, 397, 398, 399, 402, 403
Skeletons, 42
  articulated, flexed, 21
  disarticulated, 21
Skelton Site (25CH8), 216, 255
Skin working, 245
Skulls, human, 22, 41
Skunk, 204
Skunk People, Indian band, 433
Slave, woman, taken by Indians, 380
Slim Buttes, S. Dak., 386
Smallpox, pictured by Indians, 352, 358, 362, 363, 374, 378
  See also Measles.
Smith, Alfred G., 274
Smith, Carlyle S., 142, 237, 278, 284, 287, 291, 299, 300, 301, 304, 305, 307, 308
Smith, J. Russel, 439

Smithsonian Institution (collecting party), 139, 159, 164, 172, 173, 174, 183, 187, 191, 193, 196, 201, 202, 236, 238
Snelling, Alfred, and the Trukese castaways, 288–290, 292, 293, 294, 309
Snow, used for drinking water, 427
Snowshoes, shown on Indians, 367, 368, 376, 381
Soapstone fragments, 24, 56, 57 (table), 58, 90–127 (tables)
So-at-sa-ki, mythical character, 428
Sods, used to hold down tipi covers, 457
Soldiers, represented by Indians, 363
Someki, Atsushi, 274, 276, 277, 278, 282, 283, 299
Somerset, Nebr., 210
Sonsorol Island, 287
Sorol Island, 287
Soshaki or Soshiki, Japanese inventor of type I, 296, 297
Sounding Knob, near Dry Branch, 33
South Fork, Shenandoah River, 10, 11, 17, 18, 19, 20, 23, 24, 26, 27, 36, 37, 38, 39, 40, 68, 71, 81
South River, 17, 18, 19, 20, 23, 24, 26, 27, 29, 36, 39, 69, 71, 75, 81
South Rivers District, definition of, 10, 11, 66, 71, 74, 82
Spades, bone, 215
Spanish, Mrs. Nora, 466, 468
Spatulas, bone, 198, 203, 215, 241, 242, 244, 248, 251
Spearheads, 42, 65
Spears, 268
Spear throwers, decorated, 265
    See also Atlatl.
Speck, Frank G., 424
Spence, Carl, 226
Spider Lodge constellation, explanation of name, 427–428
Spider Man, mythical character, 427, 428
Spindle whorls, bone, 242
Spoke shave, stone, 197
Spotted Bear, Indian brave, 405, 430
Spring Lake, Blackfoot Reservation, 449
Squash rinds, 238, 245
Squirrel, gray (*Sciurus calolinensis*), 32
Staff, ceremonial, 357, 367
Standing Bull, Indian brave, 394
Standing Rock Reservation, 339, 341, 343, 344, 345, 347, 353, 399
Staples Run, tributary of Calfpasture River, 18
Star Husband tale, 427
Staunton, Augusta County, Va., 17, 28, 30, 31
Stealing, punishment for, 361
Steatite fragments, 17, 19, 22, 40
Stephenson, Robert D., 140
Stephenson, Robert L., 239
Sterling, Logan County, Colo., 233
Sterling Site (6 miles northwest of Sterling), 233, 256
Sterns Creek Woodland, 238
Steward, Julian H., 244
Stewart, Richard, 265, 266
Stinking Water Creek, Chase County, Nebr., 212, 216, 217, 222
Stinking Water Focus, 142, 160, 204, 221, 251, 253–254 (tables)
Stirling, M. W.: The use of the atlatl on Lake Patzcuaro, Michoacan, 261–268
Stone, chipped, 167, 206, 209, 214
    granitelike, 167
    pecked or polished, 167, 194
    unworked, 149, 150, 154, 155, 158, 182, 187, 193, 194, 205, 210, 211
    worked, 149, 150, 151 (list), 155 (list), 158, 165–172, 182, 185–186, 193–198, 205, 206, 210, 211, 214–215, 217, 219–220, 229, 244, 246
Stone chips, definition of, 66
Stone circle sites, 458
Stones, fireburnt, 17, 26, 33, 37, 183, 187, 188, 205, 211, 217, 250, 437, 468
Stone tipi rings, archeological considerations, 437–455, 463
    conclusions, 462–464
    discussion, 456–462
    ethnological considerations, 429–437, 463
    historical evidence, 424–428
    introduction, 421–424
    possible uses of, 421–423
Stone tipi rings in North-Central Montana and the adjacent portion of Alberta, Canada; their historical, ethnological and archeological aspects, by Thomas F. Kehoe, 417–473
Stove, commercial, used in tipi, 467
Straight Creek, northeast of Monterey, 33
Strikes Many, Indian brave, 412
Stuart's Draft, on South River, 26, 27
Strong, W. D., 141, 143, 180, 182, 225
Strong-Heart warrior society, 412
Structures, 188, 212–213, 248–250
Sturtevant, William, 273
Subsistence, Dismal River Aspect, 245
Subsistence cycle, annual, 436, 456, 461, 462
Subsistence methods, 439
Suicide, method of, 375
Summary, Site 25HO21, 204–205
    Site 25HN37, 178–179
Summit County, Colo., 230
Sun Dance, Indian ceremony, 364, 428, 429, 464
Sundance, Wyo., 329
Sun Dance shelter, 428
Sunshade or summer shelter, 213, 250
Swan winter count, 346, 352, 353, 354, 355, 356, 358, 359, 360, 362, 363, 364, 366, 370, 371, 377, 382, 383, 384, 386, 392

Swanton, John R., 440
Sweat houses, 425
Sweet Grass Hills, 426
Swift Dog, Dakota Indian, 344, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409
Swift Dog group, winter count, 341, 343, 344
Sword, represented in winter count, 411
Syllabaries, Cherokee, 273
Sylvilagus floridanus, 32, 34

Tablets, slate, 42
Tall Bear, *see* High Bear.
Tamias striatus, 34
Taos, 243, 244, 247
  refugees, location of, 239
Tarascan Indians, 265, 266
Technology, 245–248
Teeth, animal, 32 (list)
  animal incisor, perforated, 25
  deer, 25
Tenney, L. F., 446
Tent peg, wooden, 428, 429, 430, 435, 445
Tents, skin, 424, 425, 426
  umbrella, 464
  wall, 464
Tepees, 425, 427
  See also Tipis.
Terrace, meaning of, 14
Terrapin, 204
Terry, Frank, 33, 34
Teton Dakota Reservation, 341
Teton Dakota tribe, 341, 342, 343, 344, 345, 346, 347, 348, 351, 355, 359, 360, 361, 364, 365, 372, 377, 391
Teya people, 243
Thedford, Thomas County, Nebr., 208
Thomas, Alfred B., 243
Thomas County, Nebr., 208
Thompson's exploration, start of Historic period, 440
Three Thigh, Indian brave, 401
Tiber Reservoir, Marias River, Shelby, Mont., 441
Tidyman, James, 456
Tie Siding, Wyo., 227
Tilden Site (4 miles north of Hudson), 232, 256
Time marker:
  A (Historic), 86–87
  B (Protohistoric), 85–86
  C (Middle-Late Woodland), 84–85
  D (beginning of Middle Woodland), 82–84
  E (transition between Late Archaic and Early Woodland), 81–82, 83, 84
Time marker—Continued
  F (Early Archaic), 81, 82
  G (beginning of Early Archaic), 80–81
Time period:
  A–B, 77 (chart)
  B–C, 77 (chart), 78, 80
  C–D, 77 (chart), 84
  D–E, 77 (chart), 78, 80, 84
  E–F, 77 (chart), 78
  F–G, 77 (chart), 79, 81
Tinder box, 274, 276, 278
Tinian, Marianas, 285
Tipi covers, skin, 423, 428, 435, 436, 437, 439, 443, 444, 445, 449, 455, 456, 460, 462, 463, 466, 467
Tipi liners, hide, 435, 464, 466, 467, 468
Tipi poles, 428
Tipi rings, Blackfoot encampment, 470 (table)
  depth of rocks, 443–444 (table), 455
  door gaps, 444
  excavations, 446–447
  quantity of rocks, 445
  rock concentrations in center, 445–446
  rock types, 445
  shape of, 443
Tipi-ring sites, 440–441, 446, 448 (fig.), 449, 450 (fig.), 451 (fig.), 452 (fig.), 453 (fig.)–455, 468
  archeological fieldwork, 440–455
  camp plans, 442–443
  location of, 441–442
  payment for use of, 434
  proportion of to other sites, 441
  remains of contents, 468
  sizes of, 442, 443, 455
  summary of fieldwork, 455
Tipis, canvas, 460, 462, 464
  in Blackfoot encampment, 469 (table), 470 (table)
  large, 436, 461
  play, used by children, 434, 436
  pre-horse period, 462
  present period, 462
  protohistoric, 435
  represented in winter counts, 352, 363, 364, 367, 368, 372, 376, 377, 379, 381, 382, 394, 398, 401, 413
  size, 462 (table)
  small, use of, 436
Tobi Island, 287
Tomahawk, carried by Indian, 382, 400
Tongue River, 398
Tools, bone, 241, 242
  chipped-stone, 248
  ground and pecked-stone, 248
  skin-dressing, 205, 245, 252
  weaving and matting, 242
Tools and implements, 248
Torgerson, Lloyd, 464
Torquemada, quotation from, 268
Tracks Weasel, Indian warrior, 387
Trade material, 187, 204, 215–216, 221
  European, 175–176

Trail Coulee, 443
Transvestite, female impersonator, 375
Travoises, transportation devices, 372, 373, 428, 434
Treaty with halfbloods in Canada, 396, 397
Tree Top (Jack), *see* Bear Claw.
Trifolium sp., 177
Trimble, Mrs. Ralph, owner of HD-2, 33
Triodopsis albolarbris, 32
    T. fraudulenta, 34
    T. tridentata juxtidens, 32, 34
True Word, Indian chief, 389
Truk, Caroline Islands, 273, 275, 277, 285, 287, 288, 289, 290, 291, 292, 299
    alphabet of, 287–288, 292
Trukese alphabet, adoption of, 290–293, 297
Trukese castaways, and Alfred Snelling, 288–290, 292, 294, 309
Turkey, wild (*Meleagris gallopavo*), 32, 34
Turner, F. Earl, 421
Turquoise, 246, 252
Turtle Head, Indian chief, 389
Turtle Mountain bands, Plains Ojibwa Indians, 347
Turtle Mountains, 365, 366
Turtles, 245
    snapping, 204
Two Bears, Indian chief, 381, 389, 391, 394, 397, 401, 408
Two Horns, Indian brave, 395
Two Kettle band, Teton Dakota tribe, 345

Ulithi Island, 287
Ulna pick, 198, 203, 215, 248
Ulul Island, Carolines, 289, 290
Umatilla Reservation, Oreg., 468
Uneitor, Trukese teacher, 290
Unionerus tetralasmus, 177
United States troops, Indians attacked by, 365
University of Colorado Museum, 139, 231
University of Denver, 139, 227, 229, 230, 233
University of Hawaii, 273
University of Kansas, 237
University of Nebraska, Department of Anthropology, 160, 172, 173, 174, 176, 179, 187, 209, 221, 228, 229
University of Utah, 139
Upper Pend d'Oreille Indians, 423
Upper Republican, 179, 211
Upper Republican people, 239
Upper Rio Grande Pueblos, 244
Urocyon cinereoargenteus, 34
Ute Indians, 361, 437
Uyehara, Dr. Y., 273, 274

Vai syllabaries, 273
Valentine, Mann S. and Granville, G., explorers of RB-7, 42
Valentine Museum, Richmond, Va., 8, 40, 41, 42, 56
Vegetal remains, 177, 204, 216, 217
Ventridens ligera, 32
Verona, Va., on Middle River, 29, 30
Vessels, miniature, 214, 237
    shapes of, 162, 213, 247
    sizes of, 213, 247
    soapstone, 56, 57 (table), 58, 90–127 (tables)
Vestal, Stanley (Walter S. Campbell), 339, 341, 346, 349, 352, 354, 355, 356, 359, 360, 361, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403
Vestal's Hunkpapa count, 346, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399
Vesuvius, boundary of Augusta County, Va., 29
Viele, Roy, 226
Virginia:
    Mountain section, description of, 10
    Piedmont section, description of, 10
    Tidewater section, description of, 10
Virginia Department of Highways, maps prepared by, 14

Wade's Mill, at Brownsburg, Va., 40
Wagon, four-wheeled, shown by Indians in winter counts, 393
Wahpékute, Santee group, 347, 367
Wahpéton, Santee group, 347, 367
Wall, earthern, 182
Wallace Mounds, Highland County, Va., 8
Walnut, black (*Jugla nigra*), 149, 177, 245
Walnut hulls, 32
Wanáği tipi ceremony, 362
Wand, feather-decorated, 351, 353, 354, 369, 379
War bonnet, 406, 411
    first, 372, 373, 384, 385
    four-horned, 383
    Sioux, 349, 373, 380
Washington County, Colo., 229
Water pail, metal, 352
Wauneta, Nebr., 216
Waynesboro, Augusta County, Va., 17, 18, 19, 20, 23
Waynesboro Nurseries, Lipscomb, Va., 18, 20
Weakly, Harry E., 140, 142, 177, 179, 209, 210, 211, 216, 221
Wears Hat, Indian brave, 406
Wedel, Waldo R., 140, 141, 142, 143, 222, 238, 239, 422
Welch, A. B., 341, 342, 343, 345, 347, 374, 399, 402, 408, 410, 412

Weld, Colo., 233
Weld County, Colo., 228, 229, 233
  general site, 233, 256
Weld Site (northeast of Weld, Colo.), 233, 256
Wellington, Larimer County, Colo., 228
West Fayu, Woleai Islands, 273
We-ta-piu band, Cheyenne Indians, 361
Weyer's Cave, on North River, 39
Whiskey, found by Indians, 395, 396
Whistle, bone, 198, 199, 242, 248
White, Theodore, 140, 204
White Beard, white man, 384, 399, 400
White Bull, Teton Dakota Indian, interpreter, 346, 349, 352, 353, 354, 355
White Bull winter count, 339, 340, 346, 356, 359, 360, 361, 362, 364, 370, 371, 373, 374, 375, 377, 380, 381, 383, 384, 385, 386, 390, 391, 392, 394, 395, 396, 399, 400, 401, 402, 403
White Cat Village (Site 25HN37), 142, 143, 145–179, 185, 189, 194, 196, 207, 214, 219, 225, 247, 248, 249, 255
White-Cow-Killer count, Olgala band of Teton Dakota, 346, 352, 353, 354, 355, 356, 358, 360, 361, 362, 363, 364, 365, 366, 368, 370, 371, 373, 378, 383, 387, 388, 390, 396
White Dog, Indian chief, 396
White Eagle, Indian brave, 407, 411
White Earth Creek, 383
White Man, Blackfoot Indian, 431
White River, 226
White Rock sites, 239
Whooping cough, 389
Wicéyela, name applied to Yankton and Yanktonnais Dakota, 347, 366, 373, 375, 378, 379, 383, 387, 392
Wichita, 240, 252
Wiciyela group, Dakota Indians, 347 (list), 375, 377, 380, 381, 384, 385, 389, 394
Will, George F., 437, 445
Williamson, John P., 360
Williamson, Mae, Blackfoot woman, 439, 444, 446, 464, 466, 467
Williston, S. W., and Martin, H. T., 237, 238
Willow trees, 143, 145
Willson, Mrs. Gilpin, owner of site AU19, 21
Wind River Reservation, 436
Winds, effect on Indian habitations, 439
Windstorm, representation of, 363
Winter, meaning of word to Dakotas, 339
Winter counts, Dakota, 341–414
Wissler, Clark, 428, 434, 466
Witapaha, Indian tribe, 360
Withers, Arnold, 140, 442
Witthoft, John, 82, 86
Woleai atoll, Caroline Islands, 273, 274, 275, 276, 277, 278, 279, 280, 285, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296
Woleai language, 299 (list), 302, 304
Woman-Good, Indian woman, 413
Wood, charred, 205, 213, 217
  mineralized, 167, 446
  rotten, 207
Woodrat (*Neotoma* sp.), 32
Woodward, Arthur, 175, 176
Wray, Wray County, Colo., 230

Xochimilco, Valley of Mexico, 266

Yanktonai tribe, Standing Rock Reservation, 341, 342, 343, 344, 346, 347, 368, 377
Yap Island, Caroline Islands, 284, 286, 297
Yellow Bucket, death of, 384
Yellow-Lodge (Dakota Indian of mixed blood), 343, 413
Yellow-Lodge, Mrs. Teresa, owner of count, 343
Yellow-Lodge Count (Blue Thunder Variant III), 343
Yucca, 143
Yuma County, Colo., 229, 231

Zahn, Judge Frank, translator, 344, 346, 362, 365, 383, 398, 404, 407, 409, 422
Ziegler, Donald, 421
Ziegler, Jerry, 421

○

SMITHSONIAN INSTITUTION LIBRARIES
3 9088 01421 9232